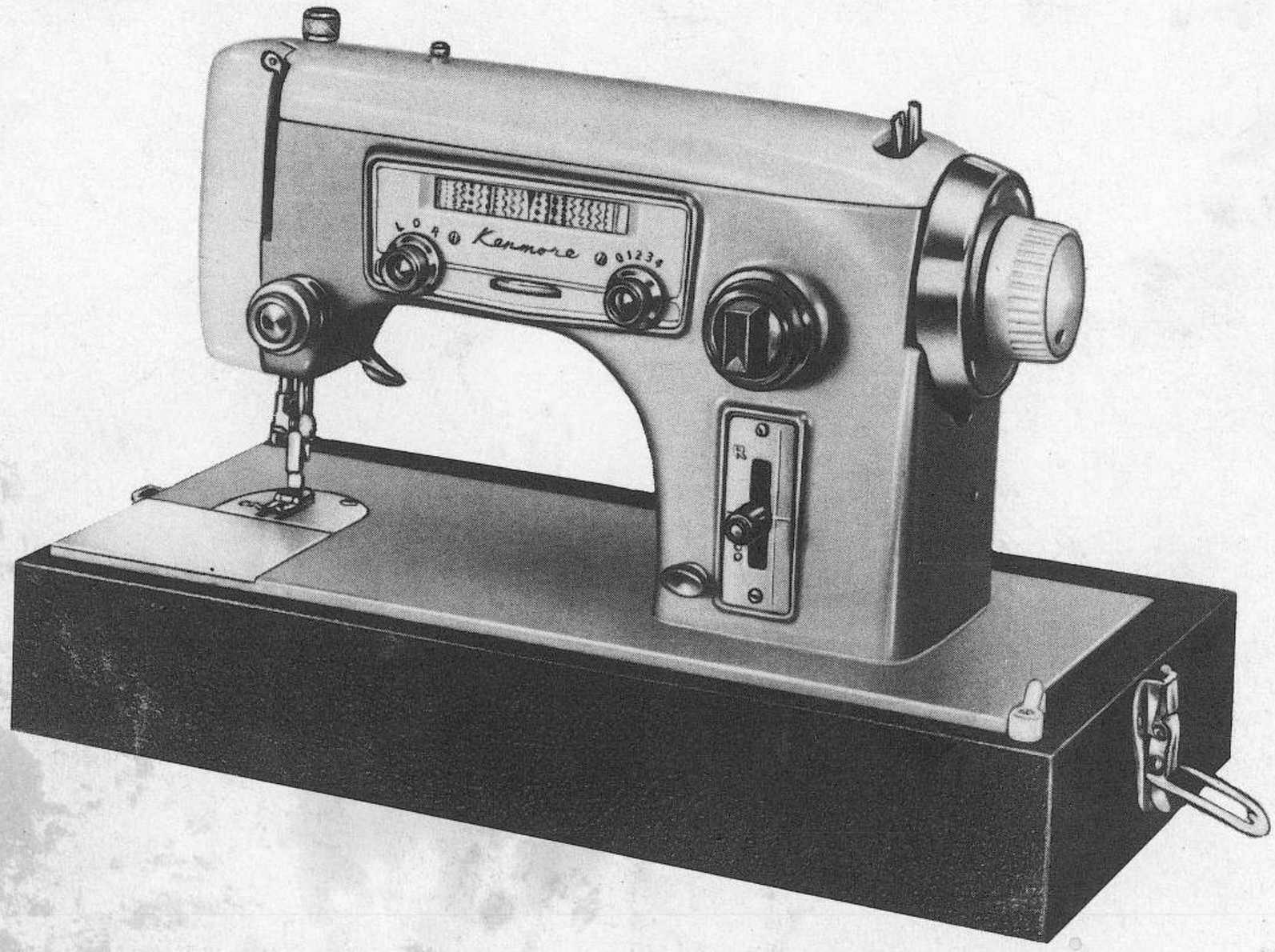
SEARS NATION-WIDE SERVICE

FACTORY APPROVED METHODS — GENUINE SEARS PARTS

SERVICE WHAT WE SELL

PT—EFFICIENT—ECONOMICAL

Service



KENMORE
AUTOMATIC ZIGZAG SEWING MACHINE
MODELS 516.890 AND 516.891

ISSUED IN THE INTEREST OF BETTER SERVICE BY THE
PARENT SERVICE DEPARTMENT 731A - CHICAGO

DIV. 20 SEPTEMBER 1959 NO. 5

INTRODUCTION

SERVICE MANUAL FOR KENMORE AUTOMATIC ZIGZAG SEWING MACHINE MODELS 516.890 and 516.891.

The service techniques used in this model are very similar to those outlined for German made models No.'s 117.740, 117.840 and 117.841.

Repair parts are to be ordered from the Control Stores indicated in the Standard Nomenclature price lists for this model. On this model and now also with the older German models, complete parts availability has been set up. This means that on any current sewing machine whether of the automatic zigzag or straight stitch type, complete repairs should be made in the local store service shop. The only exception to this rule might be a bent crankshaft or a broken or cracked base or arm. In these cases create an MCIR as per bulletin S-381 and Bulletin 0-260, and send the MCIR to the sewing machine buyer, Department 620, Chicago for disposition.
(Note) There is no relationship whatever of this machine with the White Sewing Machine Company. Notice the change in source No. from 117 to 516.

This manual will include some of the rudimentary instructions on the location of the various controls and parts plus basic operating instructions given to the customer in the Customer Instruction Booklet. This is done in order that any serviceman can easily familiarize himself with the threading, tension adjustments, etc., of this particular model sewing machine. The serviceman is encouraged to become familiar with the operation of this sewing machine in order that he will create confidence in the customer when he is called into the home for service. Operate the Position and Width Controls, the Zigzag or Fashion Stitch selector, etc. in order to become well acquainted with the functions of each. Also read through a copy of the Customer Instruction Booklet and with the necessary materials in the machine make some of the fancy stitching that is indicated in the booklet; follow the instructions. This will help the serviceman become well enough acquainted with this machine so that he can talk intelligently with the customer when questions in the home are asked or as they might be, under some circumstances, over the telephone.

Also it is suggested that the serviceman acquaint himself with the guarantee, in fact, with the three different guarantees: 20, 25 and 30 year types. Note that this guarantee involves only the principal mechanical parts and is meant primarily to give customer confidence in the original manufacture of the basic machine. Note also, that the customer is held responsible to use her instruction book in an effort to remedy her own problems; to learn to make the necessary tension adjustment changes and to thread the machine properly, clean out the shuttle etc. The salesman is responsible to initially instruct the customer in the proper care and operation of the sewing machine. This can be done either in a sewing school, if there is one, on the sales floor, or in the customer's home. Unless other arrangements can be made, each salesman is instructed to make at least one instruction call in the customer's home.

It has been suggested that the Customer Service Department screen all incoming sewing machine service calls. Those where it is apparent that the customer needs further instruction are taken but referred to the Division 20 Manager for handling, especially when the machine is comparatively new. All of this eliminates unnecessary free service calls and saves the serviceman time which can better be used on mechanical service problems.

CAUTION ! Take time to get acquainted with this machine. It will save you time and embarrassment.

The sewing machine is designed to perform four stitch techniques. For example, straight stitch, zigzag stitch, highly elastic curve stitch and the automatic fashion stitch. The stitch pattern panel in the customer instruction booklet shows basic fashion stitches which the machine will sew fully

automatically. These stitches are childs play to produce. Simply rotate the pattern selector knob until the arrow indicates the stitch desired. In doing this the red dot should be in the up position on the Selector Switch Knob only when those stitches shown in red are to be created, otherwise the red dot should be pointing downward. When the red dot is in the up position the peculiarily curved stitch pattern will be produced. You will notice that the forward and reverse control necessary to make these stitches will function automatically.

Of course, as with any automatic zigzag stitch machine, by decreasing the bight (width) and increasing the stitch length etc., a great variety of stitch patterns can be obtained. Additional fancy patterns can be produced by use of the twin needle which makes it possible to use two threads of different color which are sewn into the pattern simultaneously. The twin needle is inserted into the needle clamp in the ususal way with the flat toward the shuttle. The two upper threads must then be used as explained in the customer instruction booklet or in this manual. Limit the bight (width) of the stitch by setting the width and width limit controls no higher than No. 3. This is necessary in order to prevent the twin needle from striking the needle plate and breaking. Read the customer instruction booklet for further details.

FRONT VIEW

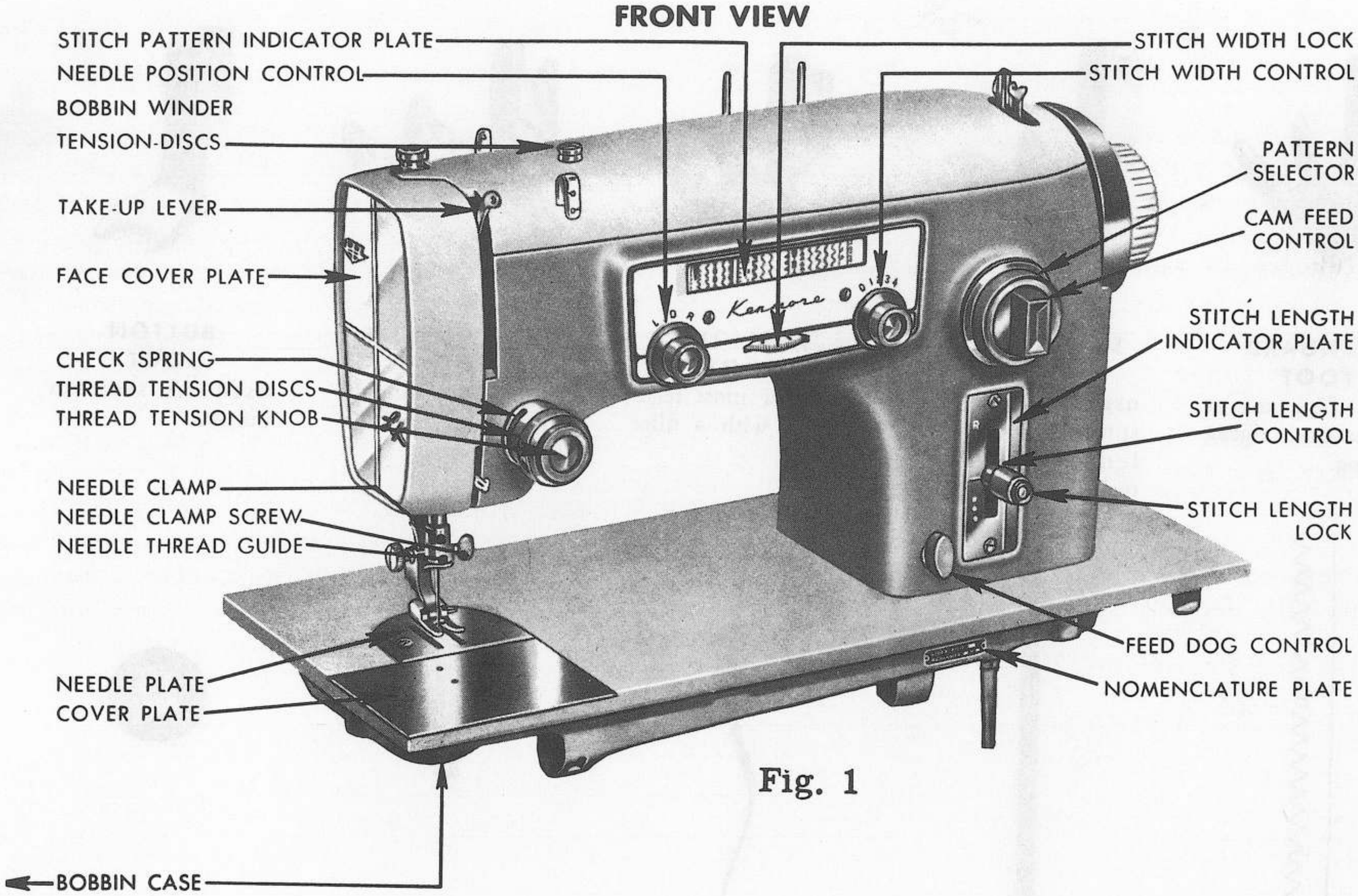


Fig. 1

BACK VIEW

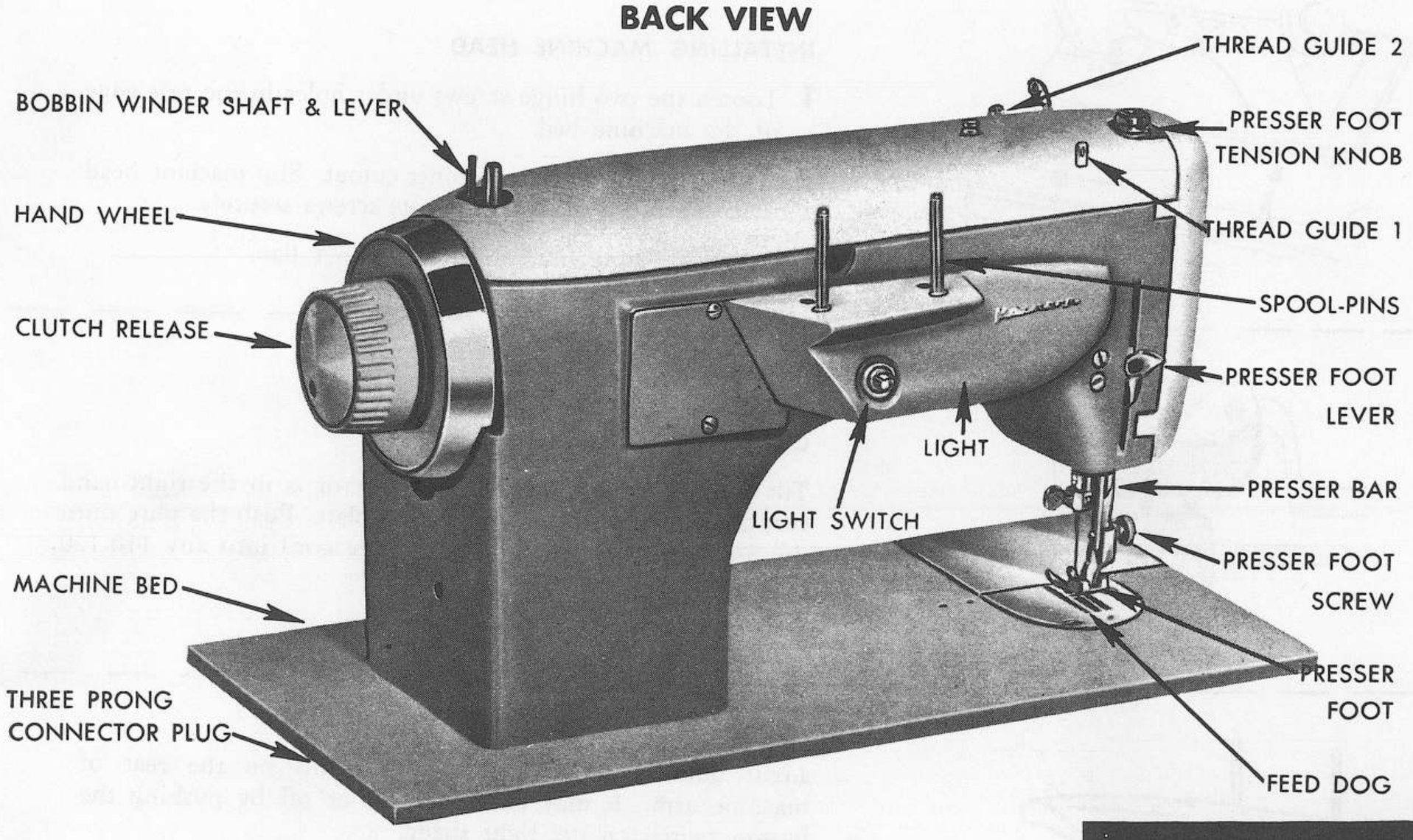
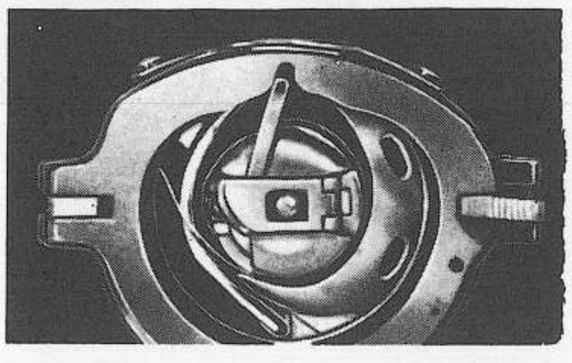
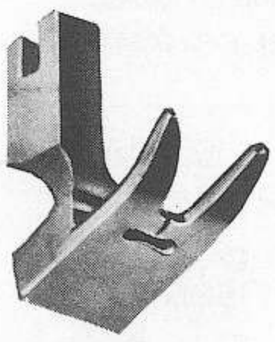
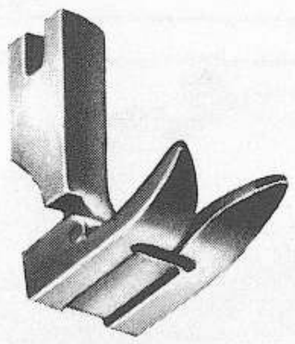


Fig. 2

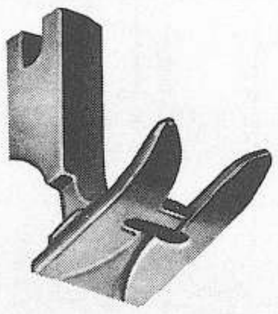




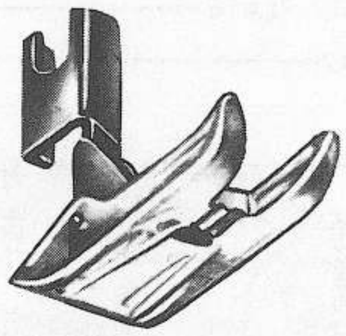
STANDARD FOOT
used for most straight and zigzag stitching.



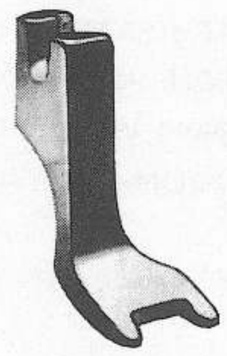
SATIN STITCH FOOT
used for zigzag stitching when stitch length control is near 0.



APPLIQUE FOOT
used for most techniques with a filler thread.



BUTTONHOLE FOOT
used for buttonholes, plain and with a filler thread.



BUTTON FOOT
used to sew on buttons.

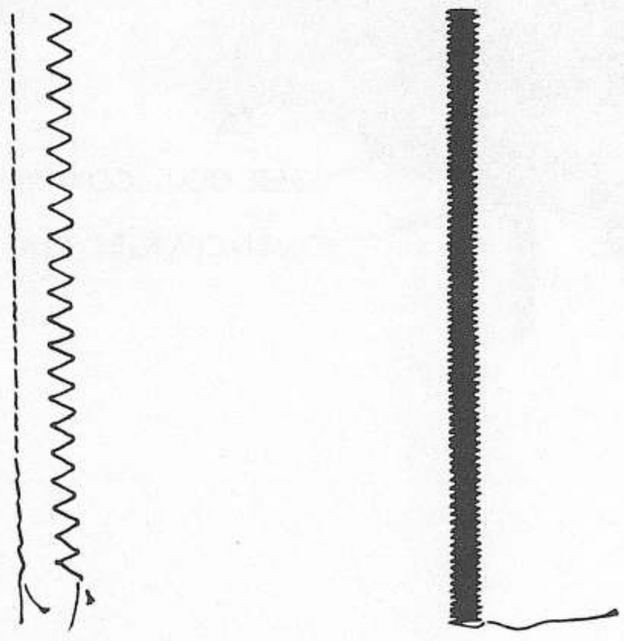
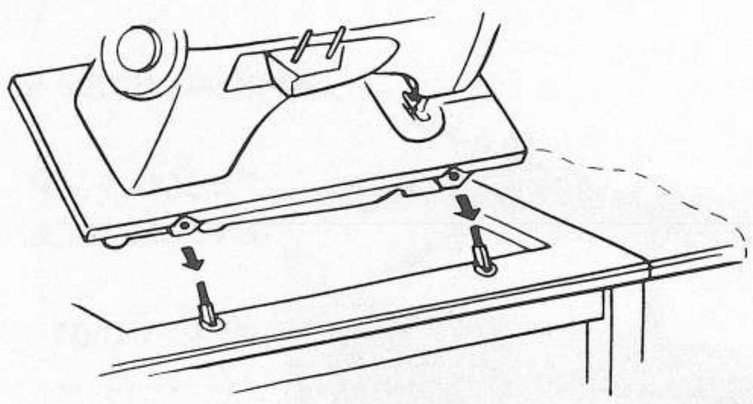
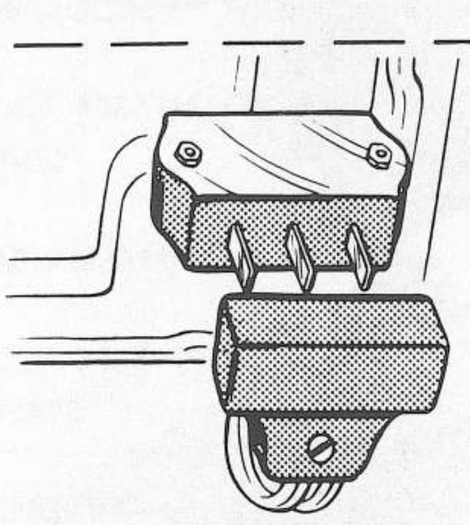


Fig. 3



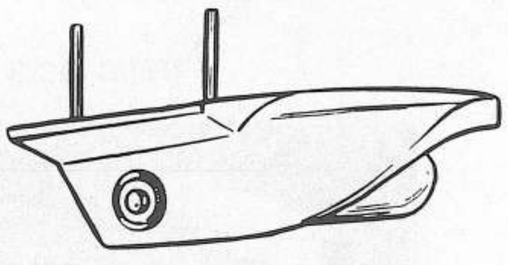
INSTALLING MACHINE HEAD

1. Loosen the two hinge screws under holes in the rear edge of the machine bed.
2. Raise hinge pins in the cabinet cutout. Slip machine head onto the pins and tighten hinge screws securely.
3. Lower machine head to front cabinet flap.



CONNECTING MACHINE

Tilt back sewing head as the connector is in the right-hand corner on the under side of the bed plate. Push the plug onto the 3-prong connector. Plug machine cord into any 110-120 volt outlet.



MACHINE LIGHT

Light bulb is located under spool pins on the rear of machine arm. It may be turned on or off by pushing the button switch on the light shade.

To remove bulb, stand at rear of the machine. Twist bulb toward you and pull from socket. To replace, push it into socket and twist away from you.

Fig. 4

SETTING STITCH LENGTH

Move stitch length control lever to the desired position between the center line and the bottom of the lower half of the stitch length indicator plate. With the stitch length indicator on the bottom, the machine sews the longest stitch. The size stitch you select will depend on the fabric you are sewing. See chart on Page **6** Recommended stitch lengths are given in numbers which refer to the markings between the center line and the bottom as illustrated here. Tighten stitch length lock so that forward and reverse stitches will be the same setting.

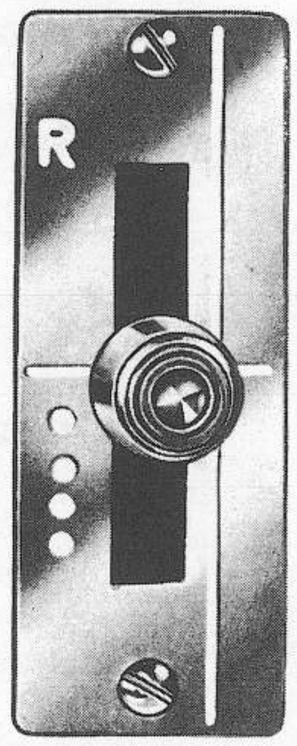


Fig. 5

REVERSE STITCHING

Move lever up until it stops. Move lever down to original position for forward stitching.

It is best to begin and end most seams with reverse stitching, often called back tacking.

FASTENING A SEAM

Be sure both threads are drawn back under the presser foot. Lower needle into fabric about ½ inch from beginning of seam. Push stitch length regulator up for reverse stitching. Stitch in reverse until needle reaches beginning of seam.

Move stitch length regulator down for forward stitching and complete seam. When you reach the end, raise the stitch length regulator and sew back over ½ inch of completed seam.

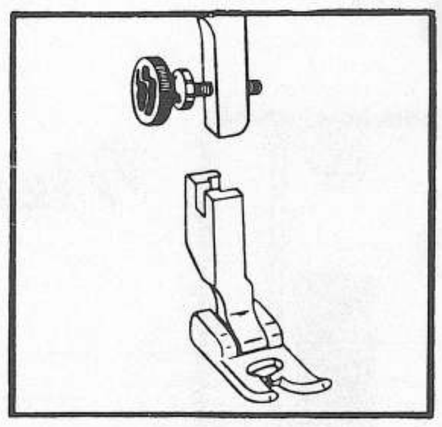
BASTING

Set the stitch length regulator for the longest possible stitch. Basting is easily removed by pulling one thread.

If you prefer to use pins for basting, your KENMORE will sew over the pins. Be sure to keep the pins at right angles to the seam and the head of the pin away from the presser foot.

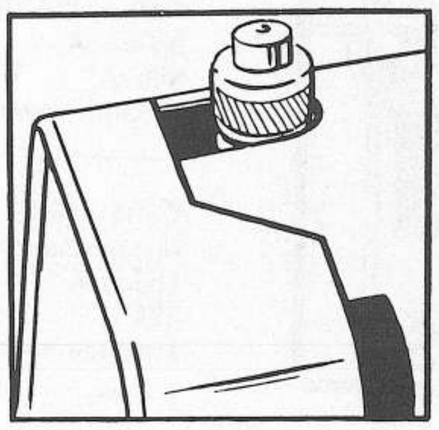
CHANGING THE PRESSER FOOT

Loosen presser foot screw with the large screw driver. Slip presser foot to the left and forward until it is free. Reverse procedure to replace presser foot. Tighten screw with the screw driver.



CHANGING PRESSURE ON PRESSER FOOT

It is rarely necessary to change the pressure on the presser foot. For those operations that require it, push down on inner pin of presser foot pressure regulator to the desired pressure. To release pressure, press down on outer ring. There should be just enough pressure on the foot to allow the fabric to move along easy, and to prevent it from racing with the needle. If one or both plies of fabric ripple, increase the foot pressure. If foot marks the fabric, decrease the foot pressure.



DROPPING THE FEED DOG

To lower the feed dog, press the feed knob and turn it to the right.

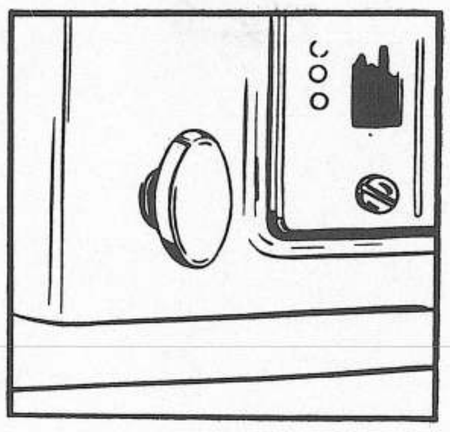


Fig. 6

Needle and Thread

SETTING THE NEEDLE— REFER TO CHART BELOW WHEN CHOOSING THE CORRECT NEEDLE FOR THE STITCHING TO BE DONE.

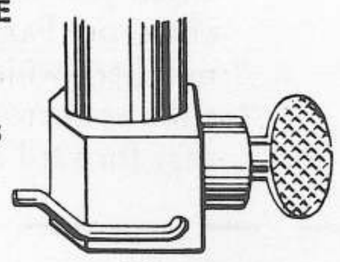


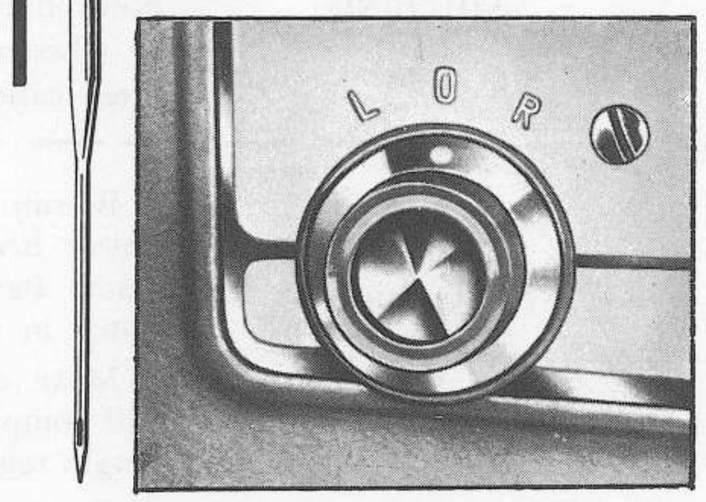
Fig. 7

1 Turn the hand wheel toward you until the take-up lever is at its highest point.

2 Hold the needle with flat side away from you.

3 Slip the needle as far as it will go into the needle clamp, and tighten the thumb screw.

SETTING NEEDLE POSITION—The needle bar should be at its highest point when adjusting needle position to avoid twisting or tearing the fabric. Set the needle position control to right, center or left for corresponding needle positions. When using a right or left needle position, check to see that needle enters the needle hole without touching the presser foot at both extremes of the zigzag stitch.



USE ONLY CENTER POSITION WITH DOUBLE NEEDLE. PAGE 11

THREAD SELECTION

Use only top quality mercerized cotton, silk, nylon, or machine embroidery thread on your KENMORE. MERCERIZED MACHINE EMBROIDERY THREAD makes a much finer decorative stitch than mercerized sewing thread.

THE SIZE OF THREAD YOU USE DEPENDS ON THE FABRIC TO BE SEWN. SEE THE NEEDLE AND THREAD CHART BELOW FOR THREAD SIZE TO USE FOR DIFFERENT WEIGHT FABRICS.

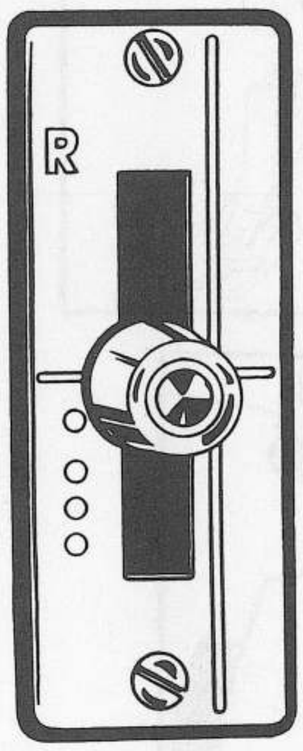


Fig. 8

Needle and Thread Table

THREAD SIZE	NEEDLE SIZE	STRAIGHT STITCH LENGTH	FABRIC
Cotton 80-100 Nylon A Silk A Machine embroidery	0	1-1½	Sheer cottons, silks, and nylons Fine laces
Cotton 60-80 Mercerized 50 Nylon A Silk A Machine embroidery	1	1½-2	Light to medium weight cottons Light to medium weight silks Medium weight nylons Light weight woolens
Cotton 40-60 Mercerized 50 Mercerized heavy duty	2	2-3	Heavy weight cottons Medium to heavy weight woolens Heavy drapery fabrics
Cotton 30-50 Mercerized heavy duty	3	3-4	Heaviest cottons as for men's work clothes Heaviest woolen coating

NOTE: To buy additional needles at your nearest Sears and Simpsons-Sears retail or mail order store, specify part no. 6021.

Upper Threading

To thread the upper part of your machine, presser foot must be up, take-up lever at its highest point, and thread on either spool pin.

1 Draw thread from back to front through slot in guide 1.

2 Bring thread forward on the right of thread guide 2. Slip thread under guide into upper slot from left side and into lower slot from right.

3 Pass thread from right to left under tension mechanism. Place thread either in front or in back of the center tension disc.

4 Pull thread against tension spring.

5 Thread from right to left through hole in take-up lever.

6 Draw thread down behind guide on needle clamp.

7 Thread needle from front to back. Pull several inches of thread through needle.

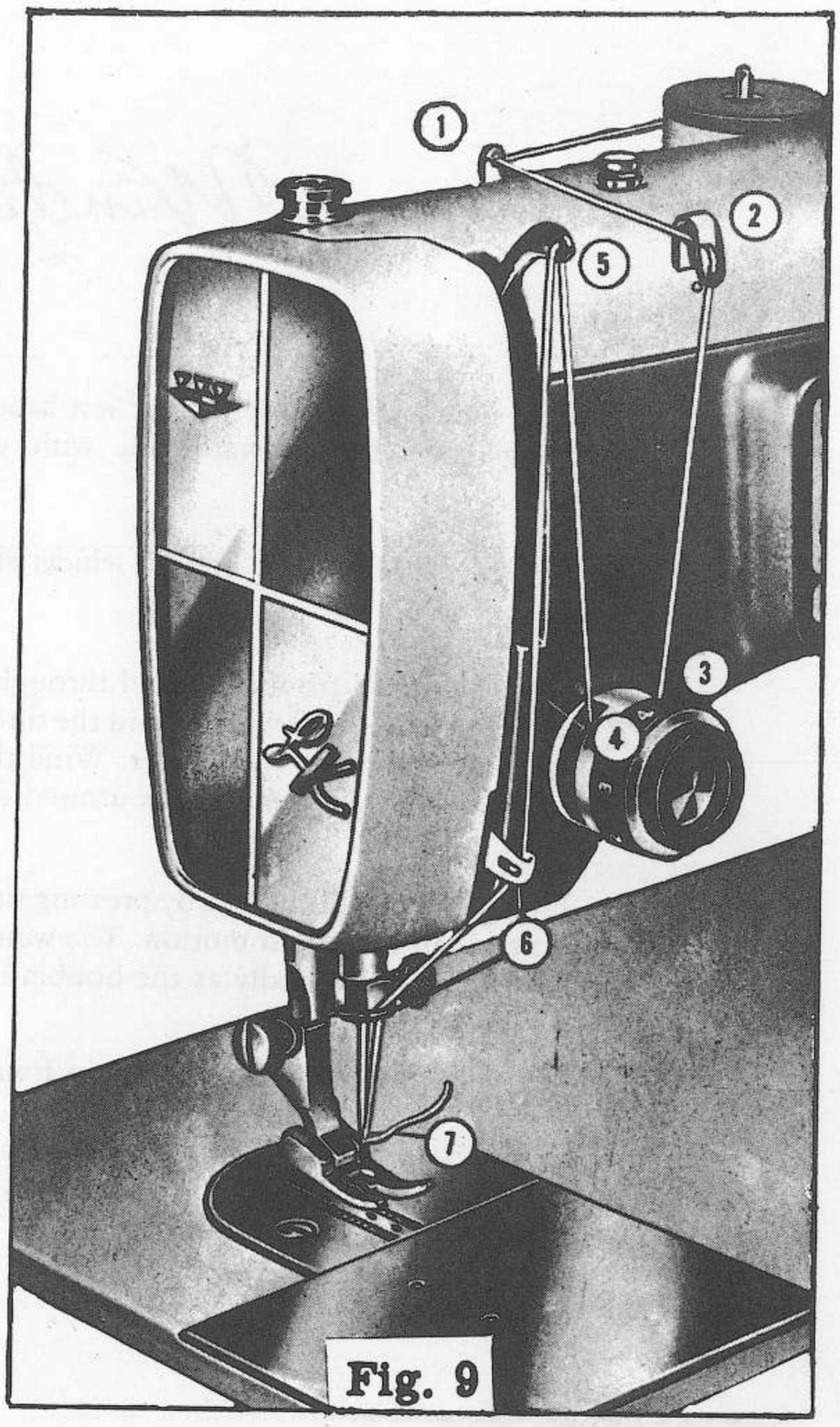


Fig. 9

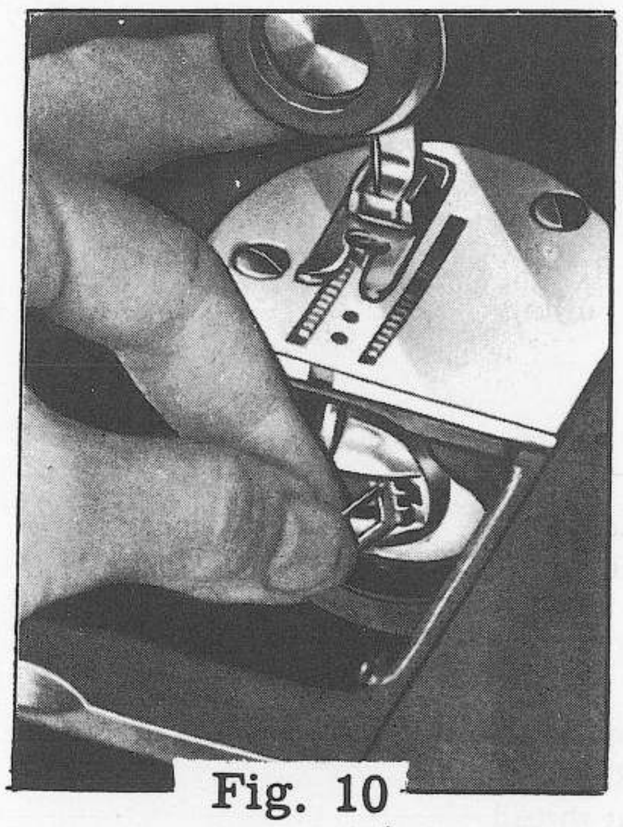
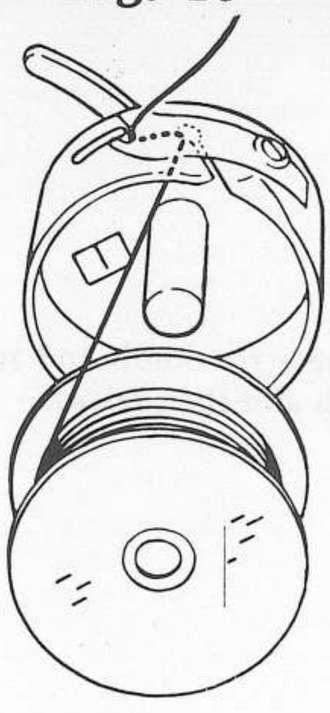


Fig. 10



REMOVING AND REPLACING THE BOBBIN CASE

Raise needle to its highest point by turning hand wheel toward you. Remove hand hole cover plate. Grasp bobbin case latch as illustrated and lift case and bobbin out. Release latch and bobbin may be removed.

To replace bobbin case, reverse this process. Hold bobbin case by the latch, with thread coming from the top, and slip case onto center pin until it *snaps* into position.

THREADING THE BOBBIN CASE

1 Hold bobbin case with open side toward you.

2 Slip bobbin into case with thread coming from left to right over top of bobbin.

3 Draw bobbin thread into the slot, under the tension spring and out through the small hole in the case, as illustrated.

4 Allow 4 inches of thread to hang free.

Winding the Bobbin

1 Hold the hand wheel with your left hand and turn the clutch release toward you with your right hand.

2 Slip the bobbin on the bobbin winder shaft.

3 Pass the thread from the spool through the guide and then once clockwise around the thread tension disks and along to the winder. Wind the thread a few times from front to back around the bobbin.

4 Engage the winder action by pressing the latch and set the hand wheel in motion. The winding action will stop automatically as the bobbin is full.

5 Cut the thread and remove bobbin from the shaft.

6 Tighten clutch release by holding hand wheel with the left hand and turning knob away from you.

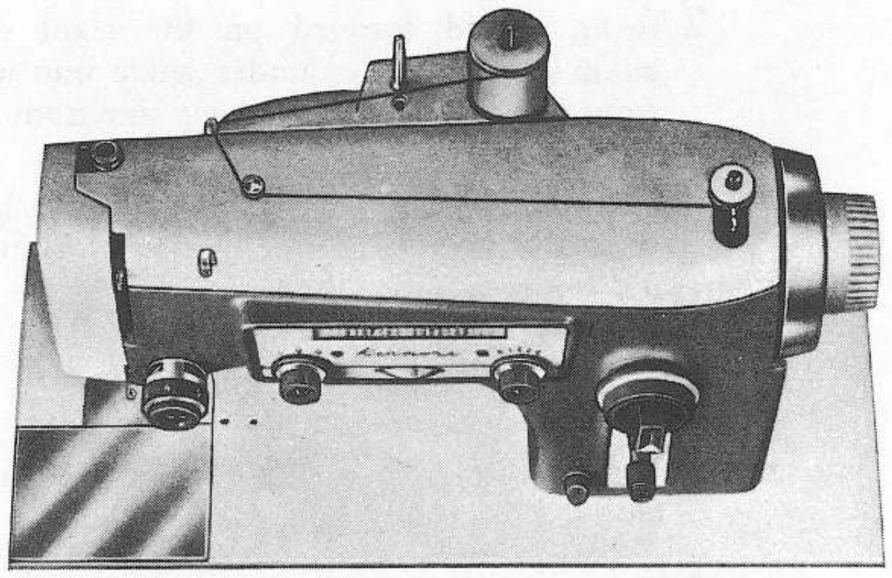


Fig. 11

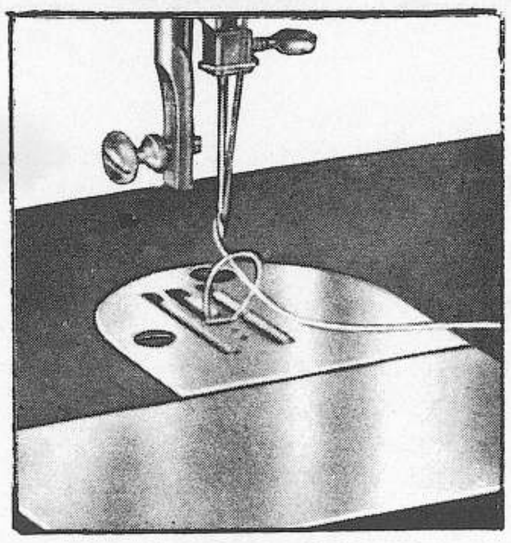


Fig. 12

PICKING UP BOBBIN THREAD

1. Set stitch width control on 0 and hold end of needle thread loosely in left hand. Turn hand wheel toward you so needle enters the needle plate hole and returns to its highest point.

2. Draw bobbin thread loop through needle plate, by pulling up on needle thread.

3. Place both threads back under presser foot.

TURNING A CORNER

Stop machine with needle still in fabric. Raise presser foot. Turn fabric to desired direction. Lower presser foot and continue stitching.

REMOVING FABRIC

When you finish stitching, turn hand wheel toward you until take-up lever reaches its highest point. THIS IS IMPORTANT. Raise presser foot and draw fabric away from you. Cut thread on rear edge of presser bar.

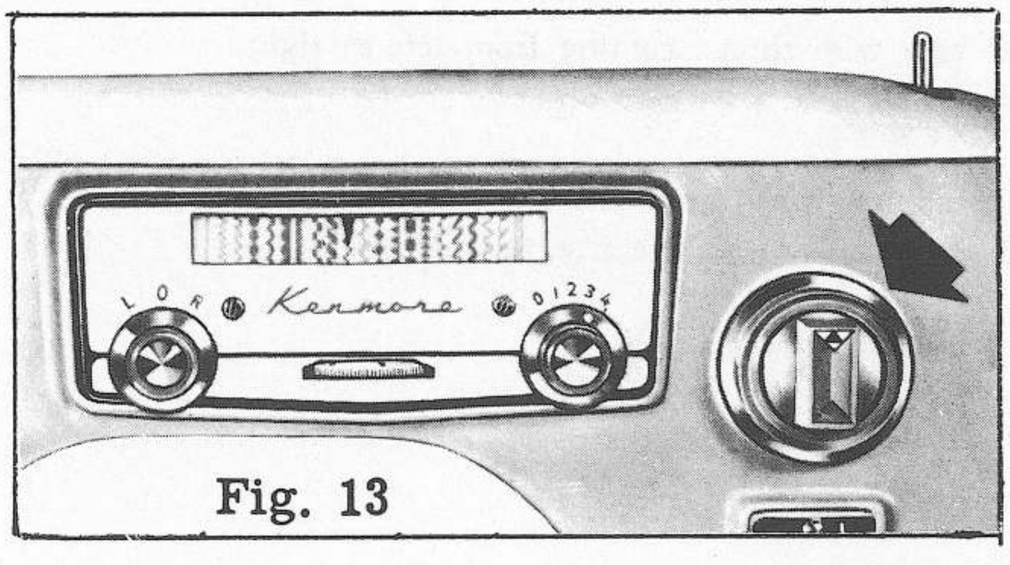


Fig. 13

PATTERN SELECTOR

To sew with the straight stitch, press the knob and rotate it until the pointer indicates the stitch and then release.

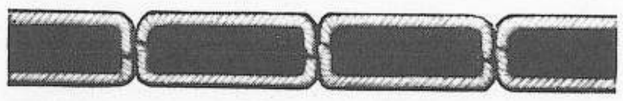


Figure A
A perfect stitch will have threads locked between the two layers of fabric with no loops on top or bottom.

Figure B
When upper thread lays on top of fabric in a straight line, upper tension is tighter than lower tension. *Loosen upper thread tension.*

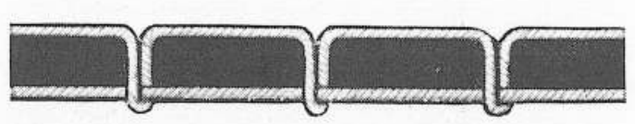


Figure C
When bobbin thread lays on the bottom of the fabric in a straight line, lower tension is tighter than upper tension. *Tighten upper thread tension.*

Fig. 14

When stitching is unsatisfactory as in figures **B** and **C**, adjust the upper thread tension. Lower thread tension is pre-set, and rarely requires adjustment for general sewing. However, if stitch is satisfactory, as in Fig. 1 and seam is badly puckered, the cause may be tight tensions, and both must be adjusted.

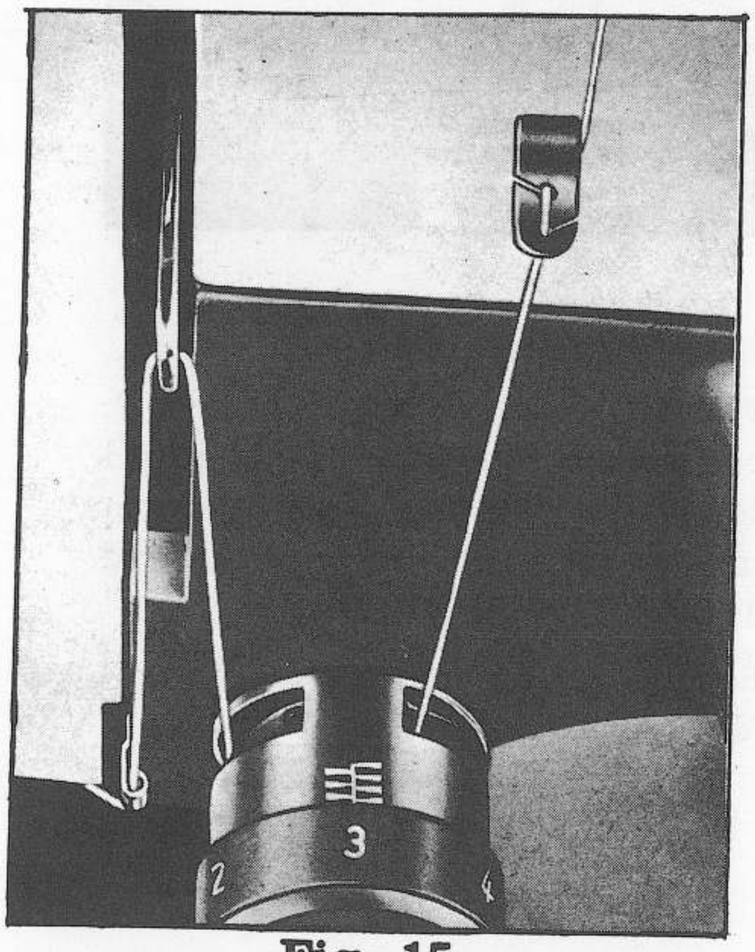


Fig. 15

CHANGING UPPER THREAD TENSION

To tighten or increase the tension on the upper thread, turn tension knob to the right. To reduce tension, turn knob to the left. The tension knob has a range of *10* revolutions.

CHANGING BOBBIN THREAD TENSION

Remove bobbin case as described on Page **7** To increase bobbin thread tension turn spring screw to the right with small screw driver. To decrease bobbin tension turn spring screw to the left. Any adjustment of the bobbin tension should be slight as the tension spring is very sensitive.

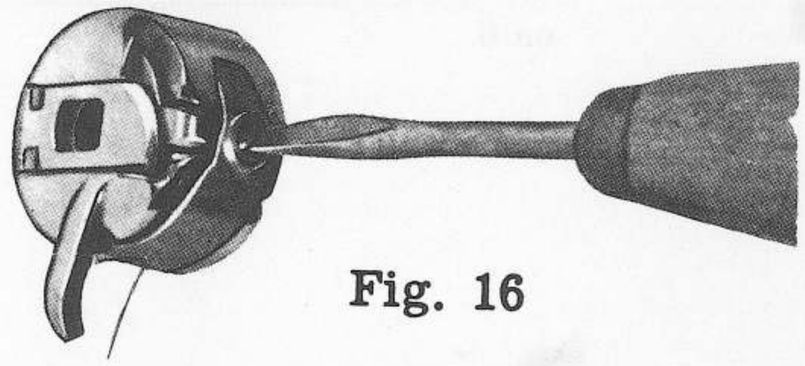


Fig. 16

If you should get the bobbin case far out of adjustment, the following method will help you reset the correct tension.

1 Begin with a full bobbin of #50 mercerized sewing thread, properly threaded into the case, and a loose bobbin thread tension.

2 Tighten the spring screw gradually until bobbin case and full bobbin can be lifted from your hand by the end of the bobbin thread.

3 Make a row of bias stitching on a double thickness of fabric. If fabric puckers —both tensions are too tight.

RESETTING BOBBIN THREAD TENSION

Hold row of stitching taut between thumb and forefinger of each hand Pull evenly with both hands until one or both threads break.

a. If both threads break—tensions are in proper balance.

b. If neither thread breaks—both tensions are too loose.

c. If only upper thread breaks—upper tension is too tight.

d. If only lower thread breaks—upper tension is too loose.

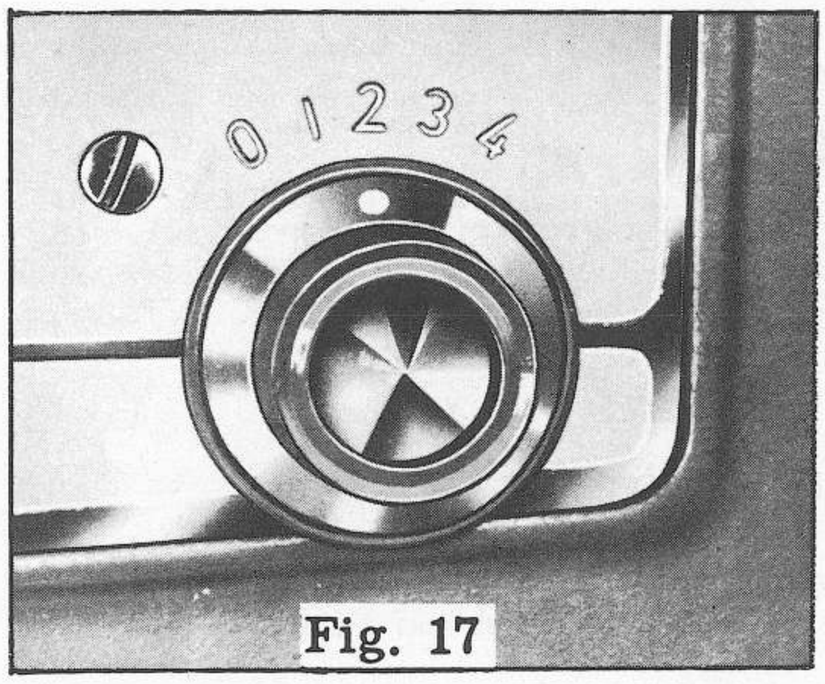


Fig. 17

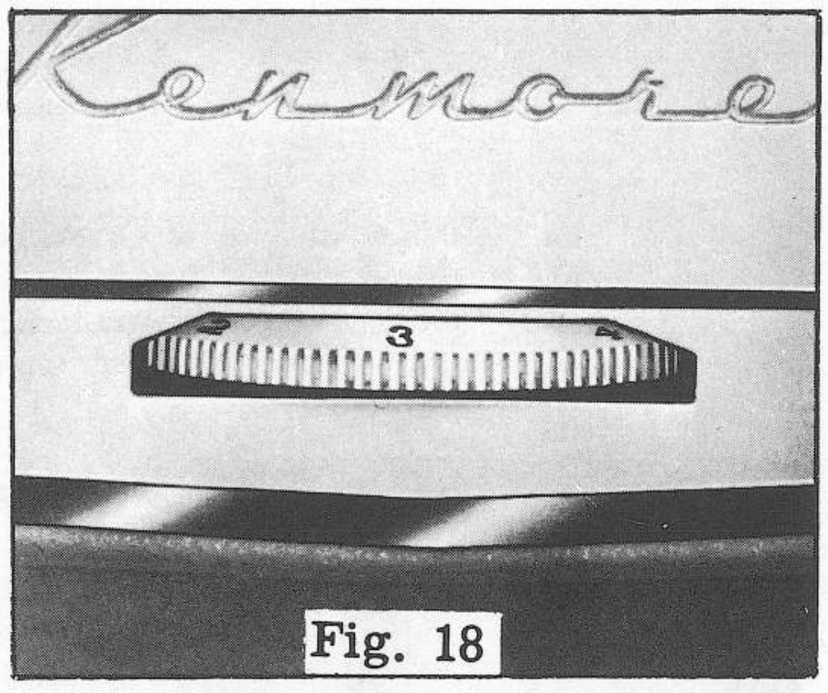


Fig. 18

SETTING STITCH WIDTH

Move stitch width control to the desired position between 0 and 4 on the stitch width indicator plate. Zigzag stitch width increases from 1 to 4 Straight stitching is possible only with control on 0.

LOCKING STITCH WIDTH

The stitch width lock has six positions—0, 1, 2, 3, 4, and buttonholes. Turn the lock to the desired stitch width setting. This limits the maximum width so that the regulator may only be moved between 0 and the number selected.

Buttonhole setting locks the stitch width at 4 and provides a partial stop at 2.

Remember

TO CHECK THE FOLLOWING CONTROLS:

1. Needle position control—usually center
2. Stitch pattern indicator plate—straight stitching
3. Stitch width control-0
4. Stitch width lock-0
5. Stitch length control—as recommended on chart,
6. Feed dog control—position 1

1. Needle position control—usually center
2. Stitch pattern indicator plate—zigzag stitching
3. Stitch width control—at selected width
4. Stitch width lock—same number as stitch width control
5. Stitch length control—varies with operation
6. Feed dog control—position 1

Double Needle SATIN STITCH FOOT OR STANDARD FOOT

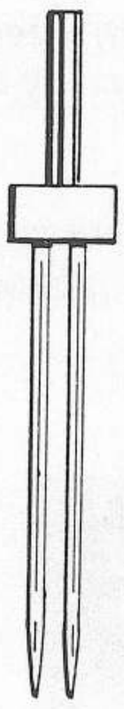


Fig. 19

Setting the Double Needle

Needle position Center

Raise the take-up lever to its highest point and loosen needle clamp screw. Hold double needle assembly with full length needle grooves toward you. Slip assembly all the way into needle clamp and tighten screw.

THREADING THE DOUBLE NEEDLE

Place a spool of thread on each spool pin. Draw the threads together and thread machine as you would for single needle sewing. Pass one thread on either side of the center tension disc of the upper tension mechanism. Draw one thread through each needle from front to back and pull several inches of thread through. Thread bobbin and pick up bobbin thread as for single needle sewing.

THREAD SELECTION

Use only mercerized machine embroidery thread or mercerized sewing thread size 50 and finer. Machine embroidery thread is recommended for both upper and lower threading.

Stitching

Set needle position on *center* and all other controls as for single needle stitching.

Most original decorative patterns and all automatic pattern stitches are possible with the double needle. Before starting any stitching operation, check needle drop by turning the hand wheel manually. With needle position control on *center,* needle should enter the fabric without touching the presser foot.

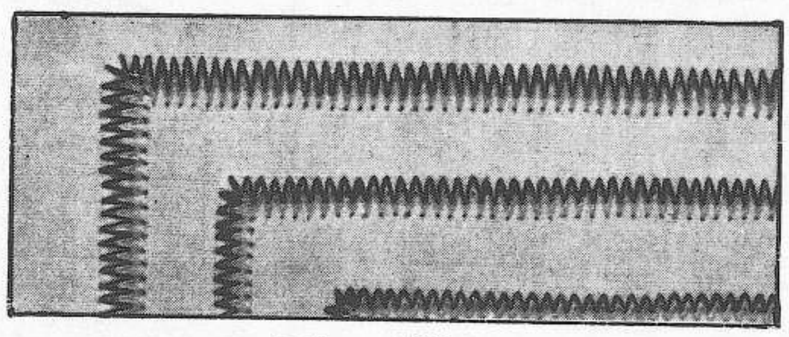


Fig. 20

TURNING A CORNER

To turn a square corner in double needle stitching, stop stitching with the needle tips just piercing the fabric. Raise the presser foot, shift fabric half the turn, lower presser foot and take one stitch. Raise the presser foot again, complete the turn, and begin stitching in the new direction.

Fig. 21

Synthetics

SEWING ON PLASTIC FILMS

Your KENMORE will sew all the new fabrics of synthetic fibers, such as nylon, *Orlon, **Dacron, rayon, acetate, blends of these, and combinations of synthetic and natural fibers. When stitching a fabric of blended or combined fibers, handle it as you would a material of the fiber present in the largest percentage. For example, a fabric woven of 60% Orlon and 40% silk should be handled as one made entirely of Orlon.

When stitching a fabric that is over 50% synthetic fiber, remember:

a Select patterns of the loose fitting type with cap or kimono sleeves, because most synthetic fiber fabrics cannot be eased with steam pressing, and are not absorbent.

b Use a synthetic thread.

c Use a fine needle as recommended in chart on page 7

d Wind the bobbin in the usual way, but do not pass thread between tension discs. Guide thread by hand for a smoothly wound bobbin.

e Set the stitch length as recommended for a similar weight cotton (page 6). Also, try some longer and shorter stitches. Choose the stitch length that gives the most satisfactory seam.

f Check thread tensions by sewing on a double thickness of the fabric to be used. Usually the upper thread tension must be loosened. Sometimes both bobbin and upper thread tension must be loosened. (page 9)

Set the machine with normal thread tensions and a large size stitch. Use a fine needle and mercerized thread. Hold plastic pieces together with cellophane tape or paper clips rather than pins. Sew corners slightly rounded rather than square.

*Trademark for DuPont's Acrylic fiber. **Trademark for DuPont's Polyester fiber.

Fashion Stitching and Attachment Use Instruction

A complete resume' of automatic zigzag sewing machine and attachments operation and application is contained in "Service" Div. 20. No. 1 issued in August of 1957. It is recommended that any serviceman desiring to improve his confidence in dealing with the customer get better acquainted with the machine operation by reviewing this manual.

One operation not included in the above mentioned manual is blindstitching. For this reason it is included here.

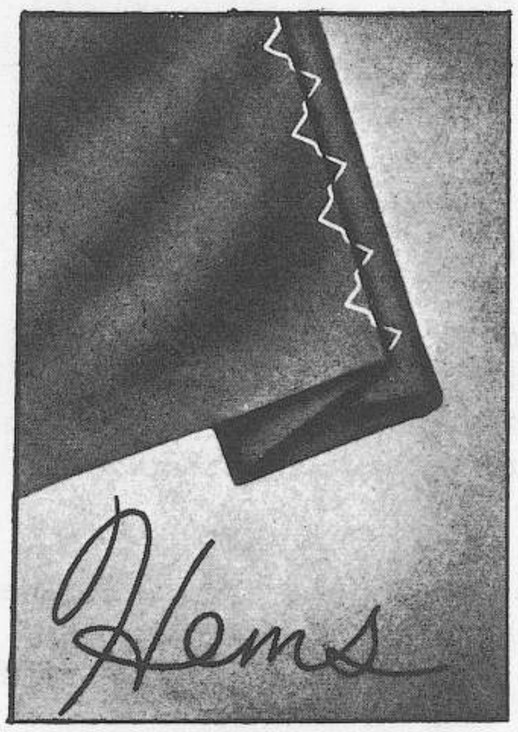


Fig. 22

Making A Blind Stitch Seam

SETTING THE MACHINE

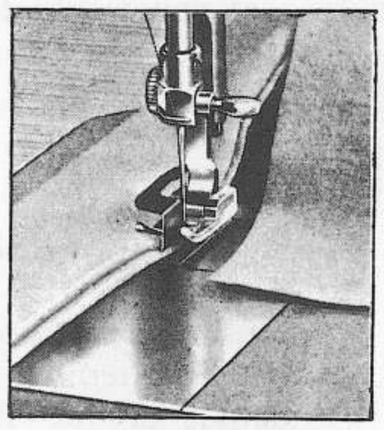
Set the pointer to the decorative stitch required and adjust the right control lever to suit the material to be sewn (i.e. between 1 and 1½). Set the stitch length lever between 1 and 2. Use normal thread tension. Attach the blindstitch guide with presser foot . . . to the presser bar.

BLINDSTITCHING WITH GUIDE

When using the special blindstitch guide, the stitches will be visible on one side of the fabric only.

METHOD OF WORKING:

1. When working with lightweight materials, fold the raw edges approx. 3/16" over to the left side. With heavier goods, such as jersey or woolen goods generally, the raw edge must first be overcast or stayed before it is folded over and tacked. **(SEE "OVERCASTING")**
2. Fold the full width of the seam over to the right allowing 3/16" projection for blindstitching.
3. Raise the presser foot and place the work under the needle with the free edge of the fabric to the right of the needle. Lower the presser foot and start to sew. When deflecting to the left, the needle must sew accurately along the edge of the fold.



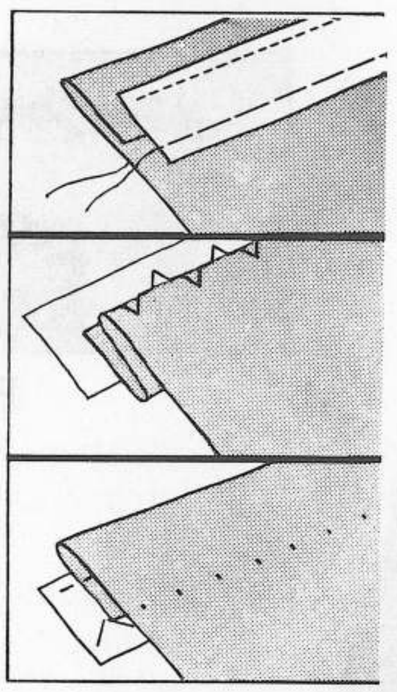


Fig. 23

Tips with Attachments

Follow these hints for a good start with your attachments:

1. The take-up lever must always be at its highest point when you start to sew, and before you remove fabric or an attachment.
2. Use a screwdriver to tighten or loosen the presser foot or attachment.
3. Stitch slowly when using any attachment.
4. Practice using the attachment on a scrap of the same fabric you will use for your garment.
5. If your attachment has an enclosed needle hole, you must put the upper thread through this hole before you start to stitch. To do this, lay any piece of material under needle hole of the attachment. Do not lower presser bar lever. Turn handwheel by hand to take one complete stitch, then pull fabric back of presser foot and away from thread.
6. Be sure needle is tight in the needle clamp.
7. If elastic thread or embroidery floss is used, it must be wound on bobbin by hand.
8. Edges of your fabric should be cut with straight shears rather than with pinking shears.

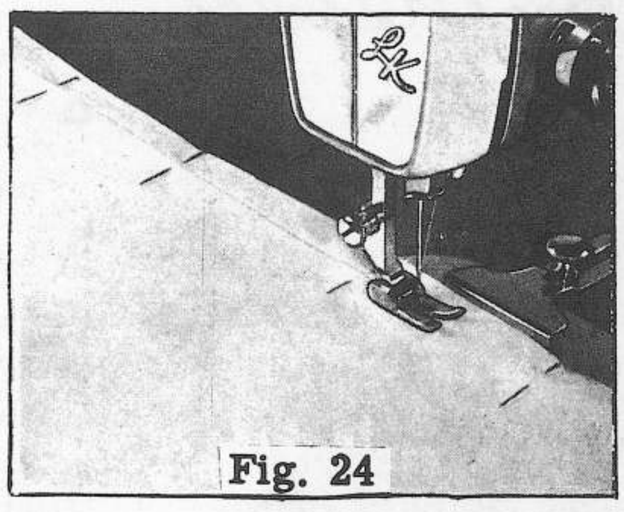


Fig. 24

SEAM GUIDE

This attachment will help you stitch hems, seams and wide tucks at an even distance from the edge. Attach seam guide to machine by placing slot over screw holes in the base of the machine. Adjust guide to the distance you want and fasten firmly using thumb screw.

ADJUSTMENTS AND SERVICE

With the introduction of this new Kenmore automatic zigzag sewing machine, the latest feature is the built in fashion stitch cams. This also involves a mechanical change in the needle bar swing action; however, this should present no serious problem since the mechanics and make-up of this new mechanism is quite simple. In fact, it is very similar to that currently being used in the Japanese made machines.

In the way of changes it should also be noted that the horizontal rocker arm is across the front under the base of the machine, and that vertical motion to the feed dog is accomplished by a cam on the shuttle drive shaft.

Mechanical adjustments on a sewing machine should always begin with the needle. Make sure that the needle is inserted all the way up into the clamp, with the flat toward the shuttle or the back of this machine. Be certain that the needle point is neither blunt nor bent and that a needle of the proper size is used for the thread size employed. Tables for this are given in the Customer Instruction Booklet and in this manual. See Fig. 8.

The importance of proper thread tension adjustment, both the upper and lower tensions, cannot be over-emphasized. A method of checking on thread tension adjustments has been outlined in every sewing machine service manual so far produced. Because of its importance this has again been reviewed at the beginning of this manual. See Figs. 14 and 16.

ADJUSTMENT OF THE AUXILIARY CHECK SPRING

This spring holds the upper thread under tension during the downward movement of the needle bar until the needle enters the material sewn. The auxiliary spring must come to rest preferably as soon as the needle point touches the material or at most no later than when the lower edge of the needle eye disappears into the material sewn.

Minor changes in the exact time of thread tension release by the auxiliary spring may be made by loosening the tension assembly retaining screw #1, Fig. 25, and rotating the assembly minutely to the left or to the right as necessary and then retightening the set screw. Large changes in auxiliary spring tensions require removal of the tension assembly. Zigzag appearing stitching when the machine is set to sew straight stitch is an indication that the auxiliary spring may be releasing tension on the thread too soon, that is before the needle enters the material. This causes or allows the upper thread to loop over the point of the needle thus causing irregular appearing stitching.

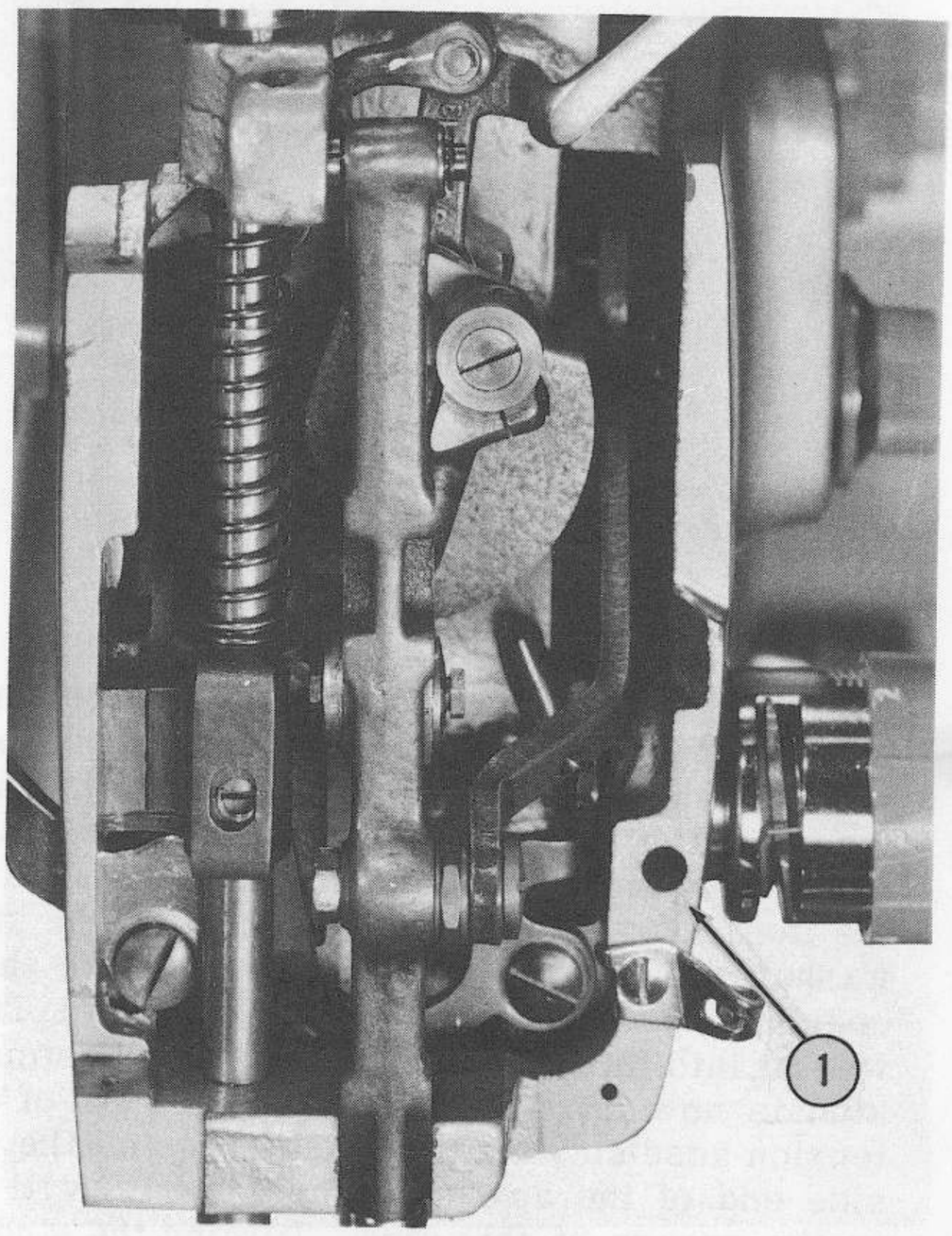


Figure 25

DISASSEMBLY OF THE TENSION ASSEMBLY

The tension assembly may be removed and the auxiliary spring replaced by first loosening the screw #1, Fig. 25 located on the front part of the arm and then pulling out the upper tension assembly. Second, screw off the adjusting knob c, Fig. 26, and remove the spiral coil tension spring b, spring retainer washer a, and the front tension disc, 1. Next loosen the screw h, on the back collar of the assembly shell g. This will allow the tension assembly mounting stud, e, to be slipped out of the assembly. Now the check spring-stop washer k, second tension disc j, and the check spring f, can be dropped out of the assembly shell, g. Be careful not to lose the tension release pin, d.

ASSEMBLY OF THE TENSION ASSEMBLY AND CHECK SPRING

Insert the auxiliary check spring into the tension assembly shell in such a way that the angled end of the spring locates in the opening on the left side of the assembly shell with the short end

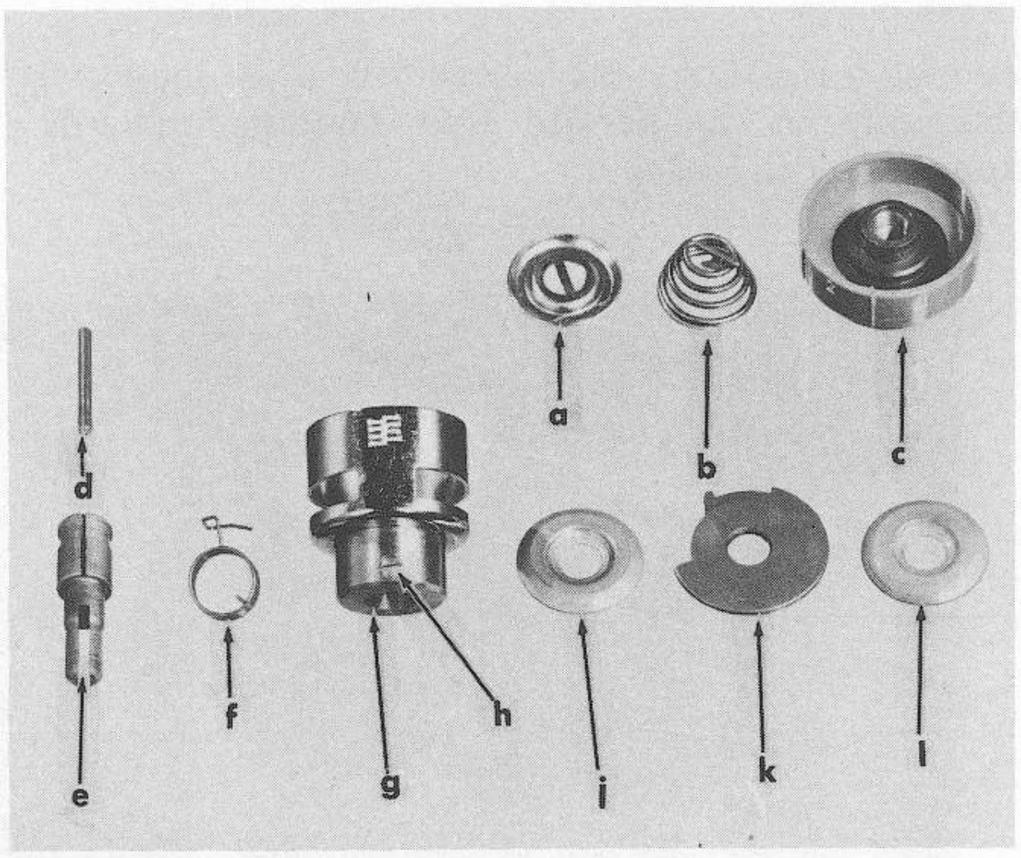


Figure 26

pointing to the back. Next slide into the shell one of the tension disc washers, convex side forward, and the auxiliary spring stop washer. When inserting the stop washer note that the small cutout should engage the tension assembly shell at the top and that the larger cutout of the stop washer will locate on the left side of the shell opening, then the angled end of the check spring will fit into this cutout. The tension adjustment stud is now introduced into the back end of the tension assembly shell in such a way that the inside end of the auxiliary check spring will lie in the groove of this stud. Turning the stud to the left will assist in getting the angled end of the auxiliary spring to rest in the cut out on the left side of the tension assembly shell.

Continuing to turn the stud in the shell hub will adjust the tension of the auxiliary check spring. When correct tension is obtained, the back end of the stud should be held flush with the shell hub and the screw h, in the hub g, tightened down to hold the stud securely. Next slide the second tension disc washer, convex side in, into the shell, the retaining washer, concave side out to accept the spring, and then place the coil spring back on the tension assembly stud small end out. Finally screw the adjustment knob on. Care should be taken that the tension release pin is put into the hole at the back of the stud when inserting the tension assembly. Position the reference — marks at the top of the shell and tighten the set screw #1, Fig. 25.

CLEANING THE SHUTTLE RACE

From time to time thread and lint will accumulate in the hook race — this can fully block the machine. To free machine operation push back the snap-on lever, Fig. 27, that locks the shuttle race cover in place; this will allow the cover to

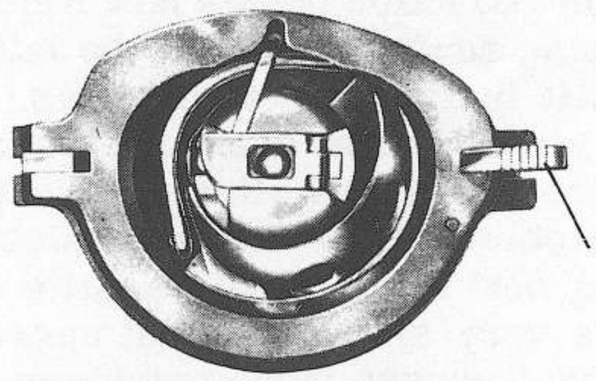


Figure 27

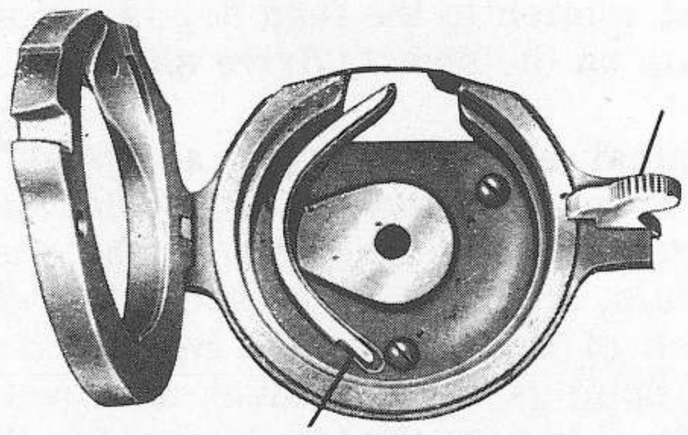


Figure 28

be opened up. Be sure the needle is above the needle plate by turning the hand wheel. Then the hook, Fig, 28, can be removed. Now the shuttle race can be cleaned of lint and thread. Use a toothpick or a small brush or something similarily soft to clean the shuttle race. Of course the frequency with which the shuttle assembly has to be cleaned depends on the amount of machine use plus the lint quality of the material sewn. It is also recommended that the needle plate be taken off from time to time so that the feed dog may be cleaned of lint (use a stiff bristled brush). When the hook is replaced the cover should be pressed in until the snap-in lever clicks into place. The machine should now run again easily and silently.

NEEDLE POSITION ADJUSTMENT

To reset the needle in its correct position, that is corresponding to the setting indicated by the needle position control, proceed as follows: First take off the top cover by simply pulling it up and away from the machine. Next, the cam packet must be removed. To do this, refer to Fig. 29 and follow the following steps:

a. set the machine at straight stitch by means of the selector knob.

b. turn the hand wheel until the driving screw in the gear on the back of the cam assembly at the machine has reached its highest position.

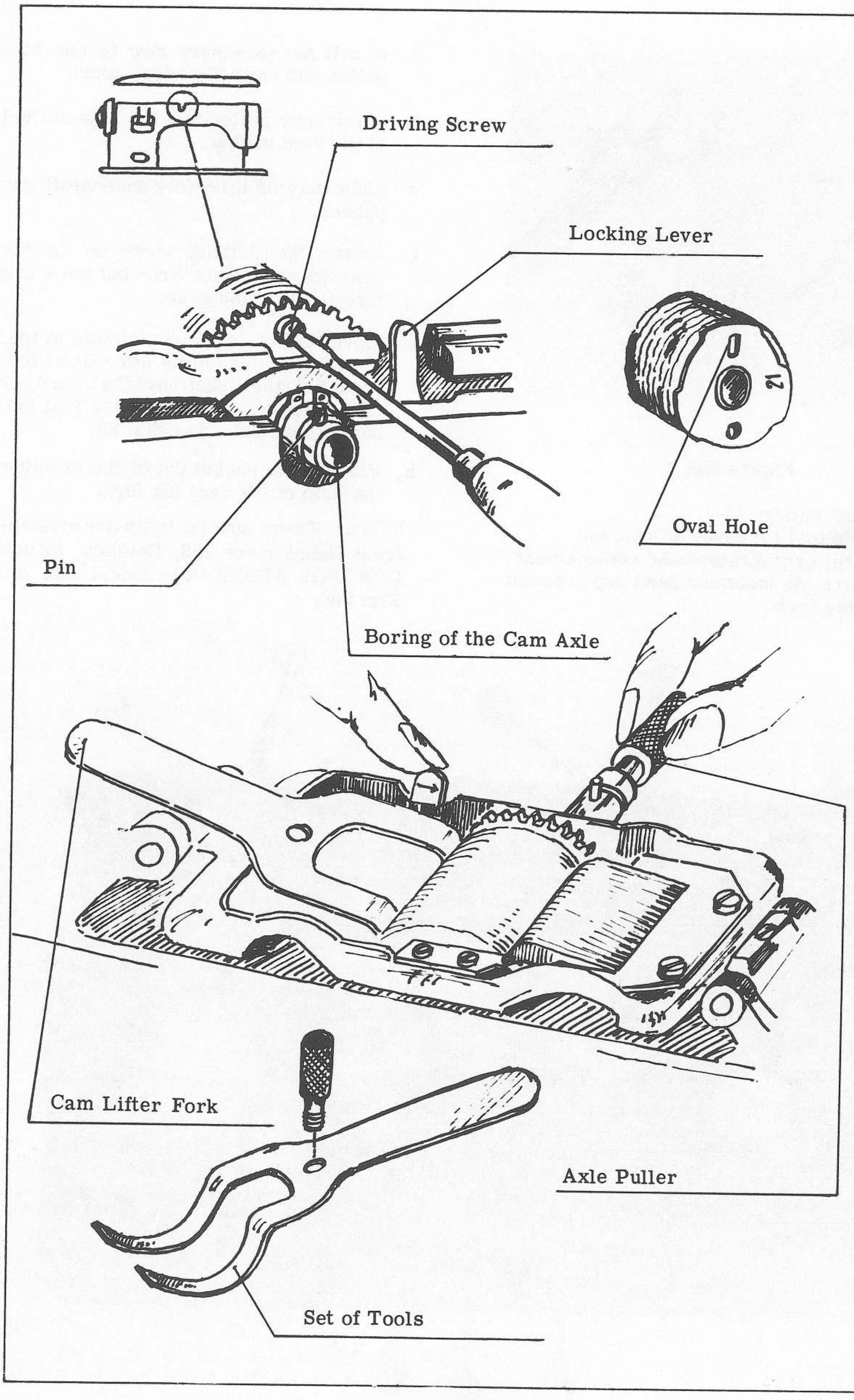

Driving Screw
Locking Lever
Oval Hole
Pin
Boring of the Cam Axle
Cam Lifter Fork
Axle Puller
Set of Tools

Figure 29

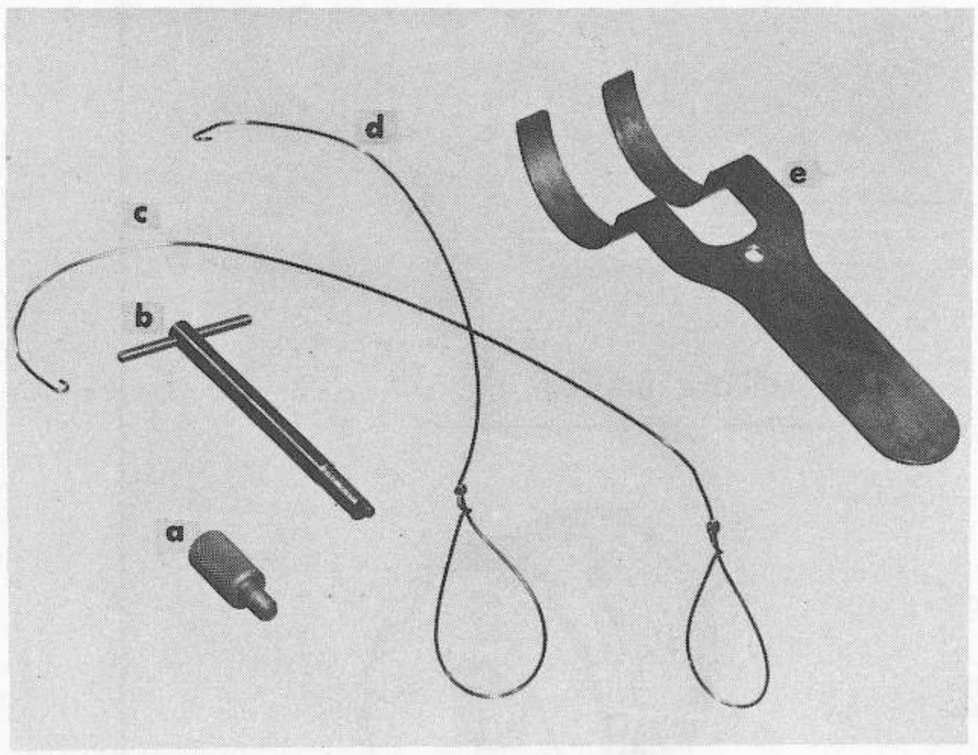


Figure 29A

a. cam shaft puller
b. eccentric tool for lever adjustment
c. long wire for indicator band replacement
d. short wire for indicator band replacement
e. cam lifter fork

c. it will be necessary now to use the axle puller and cam lifter fork tools.

d. screw axle puller into the axle at the back of the cam packet.

e. place the cam lifter fork underneath the cam packet.

f. loosen the driving screw on the farther gear three or four turns but not enough to take it out of the gear.

g. move the locking lever, visible at the rear of the machine on the left side of the cam packet, in the direction of the arrow scribed onto it, and at the same time pull the cam packet axle out. See Fig. 29.

h. lift the cam packet out of the machine with the help of the cam lift fork.

NOTE: These special tools are available from Department 806, Chicago, or your CONTROL STORE Department 206. See Fig. 29a.

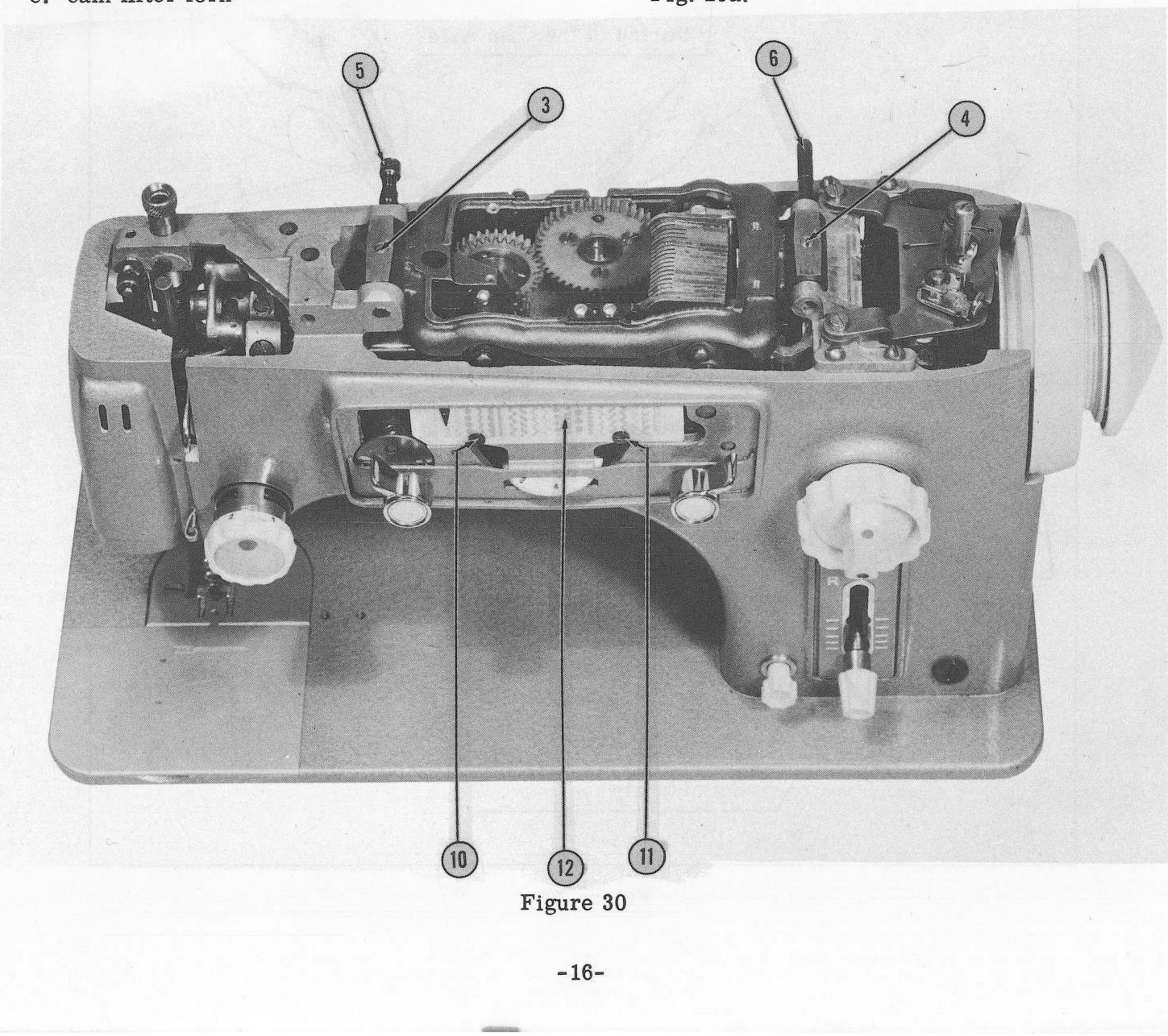


Figure 30

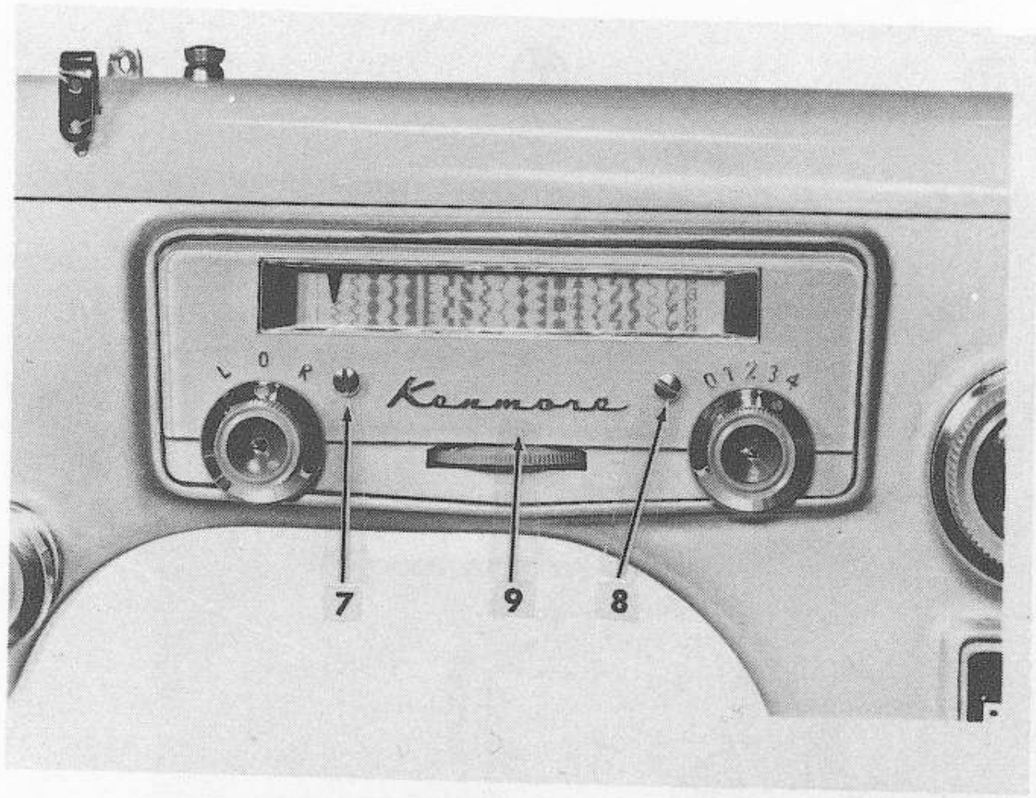


Figure 31

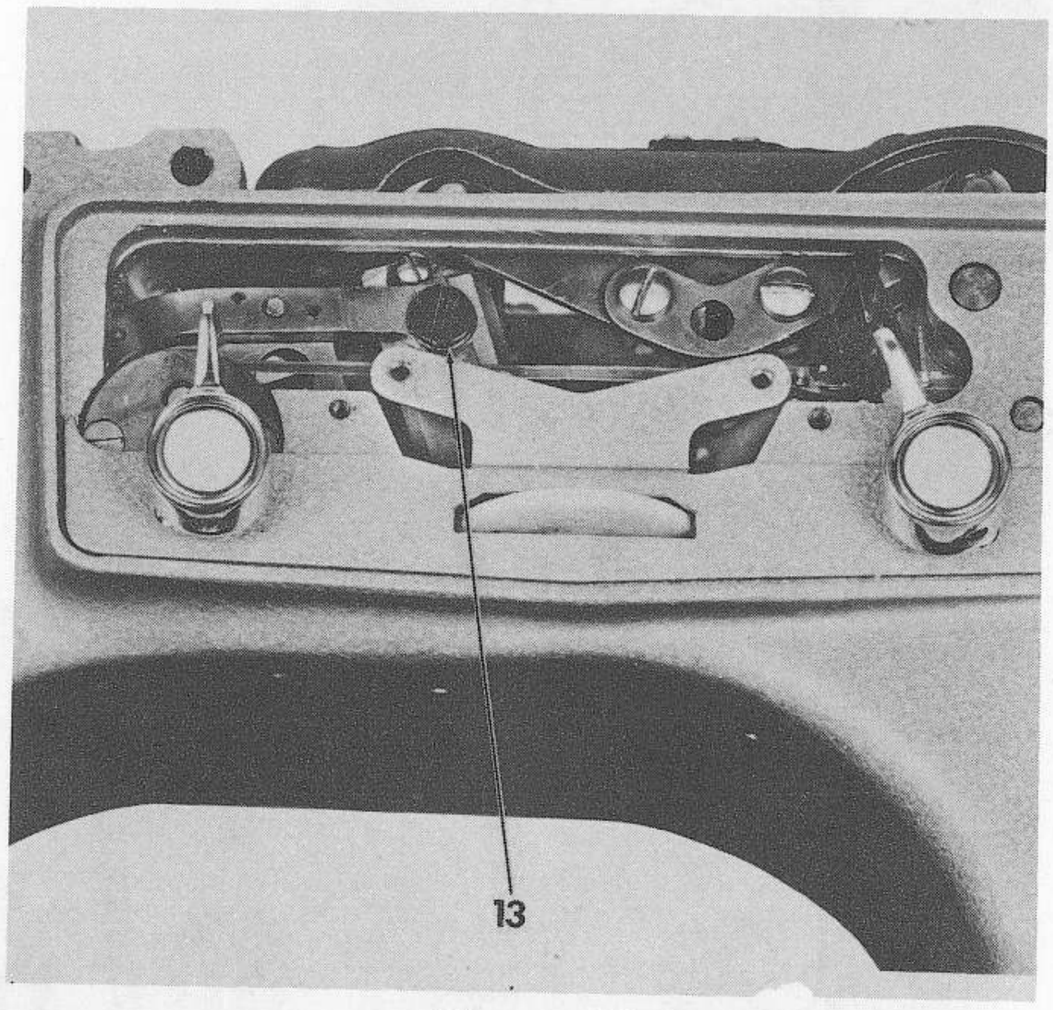


Figure 32

CAM PACKET FRAME REMOVAL

a. Refer to Fig. 30. Loosen screws number 3 and 4 on the frame. These screws are set screws holding the eccentric shaft #5 on the left, and #6 on the right. Both of these shafts should now be taken out from the back side of the machine.

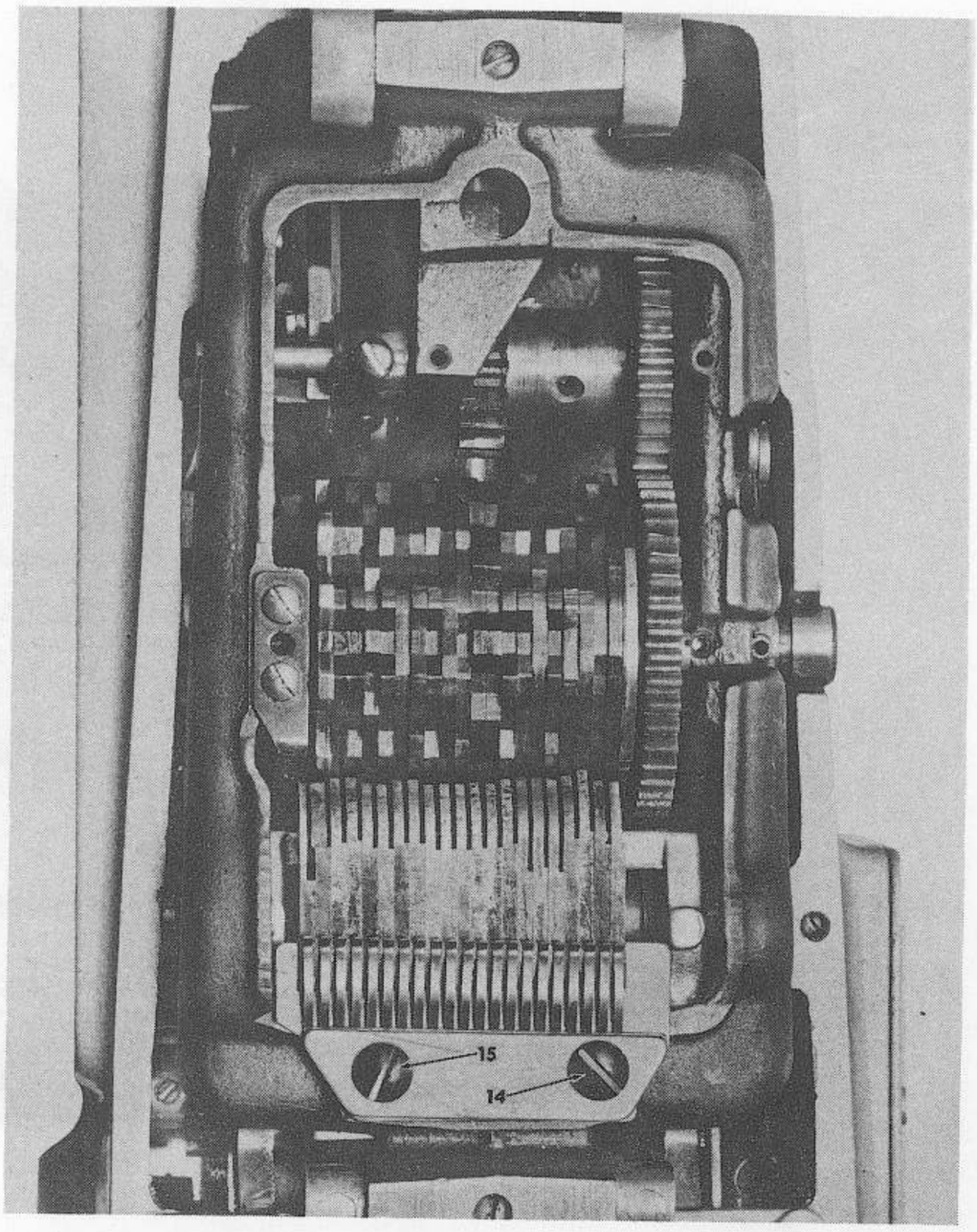


Figure 33

b. Refer to Fig. 31 and take out the screws #7 and 8, remove the safety glass panel #9. Next take off the pattern indicator plate #21 by removing the two screws #10 and 11, shown in Fig. 30.

c. Refer to Fig. 32 and remove the smooth screw #13. This will disengage the stitch width linkage from the slide block in the cam slide block.

d. Refer to Fig. 33 and remove the two screws #14 and #15. This will allow the removal of the claw follower spring and stop plate.

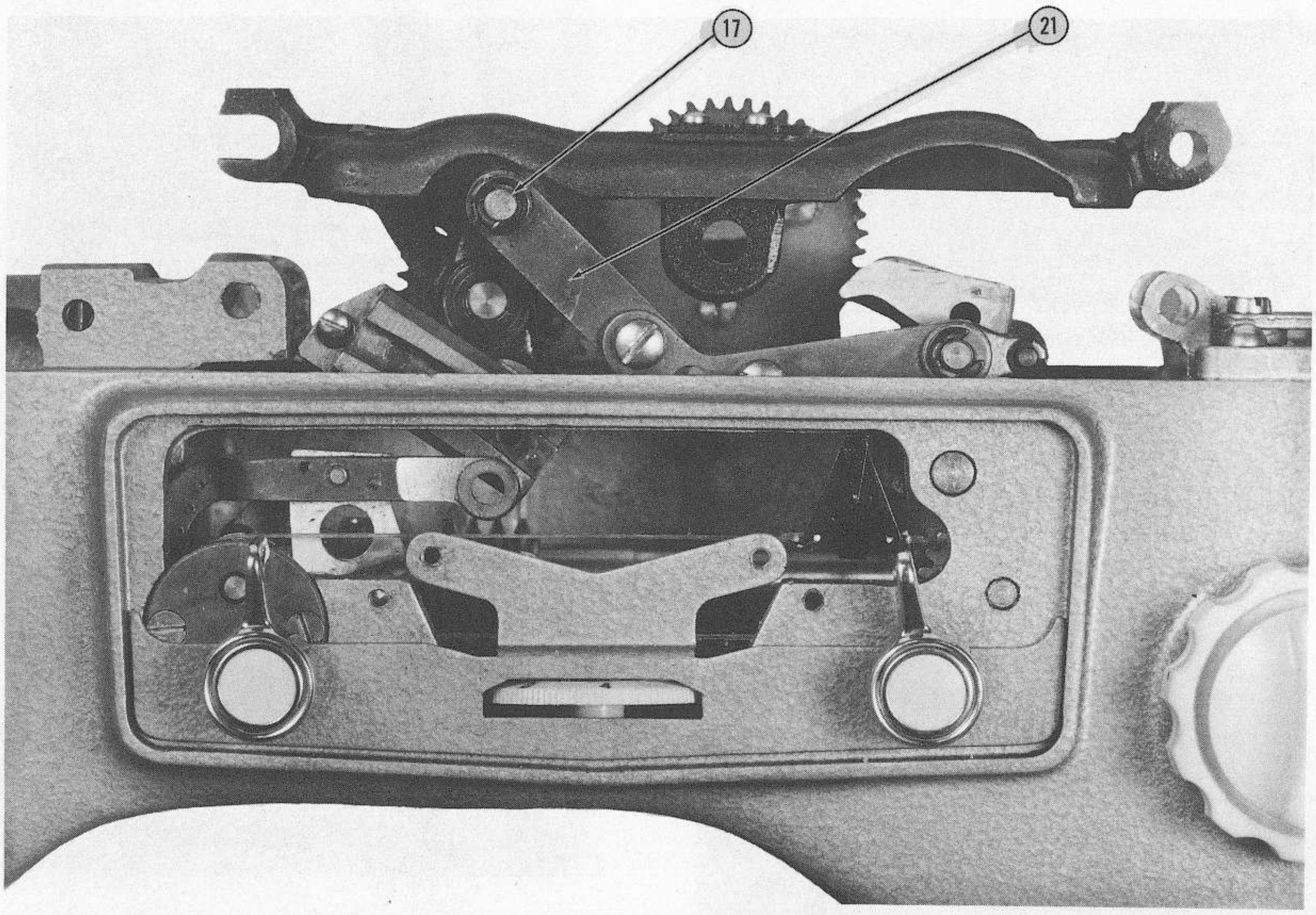


Figure 34

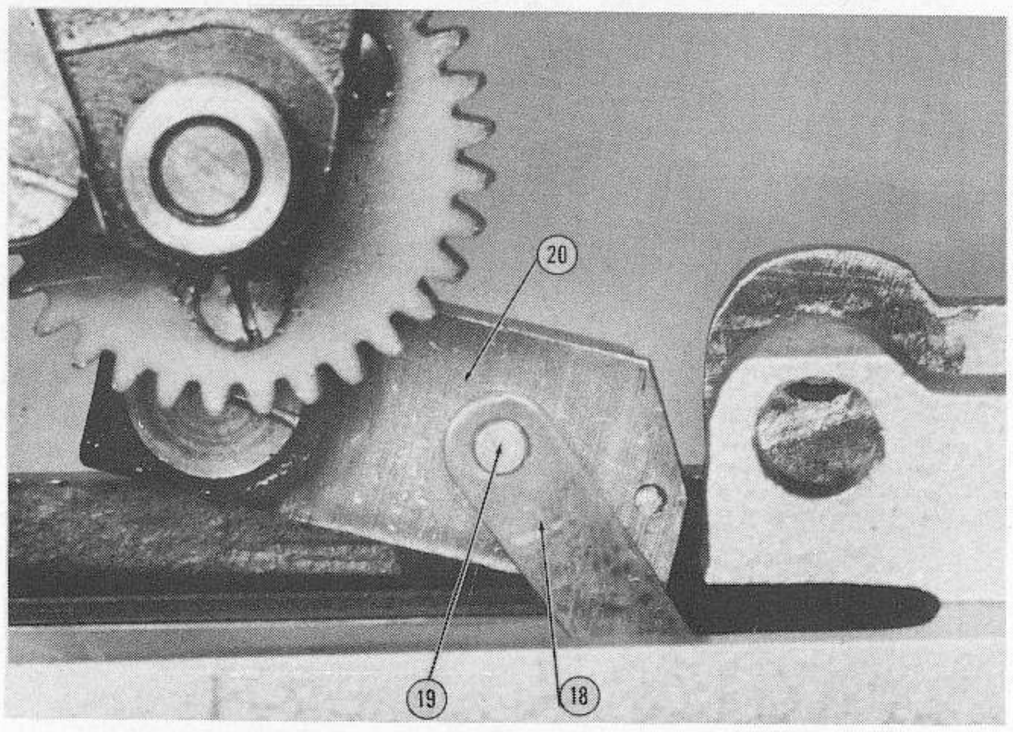


Figure 35

e. Pull the cam packet frame upward (Fig. 34) and take off the snap washer #17 from the rocker arm shaft. Remove the position control connecting link #18, Fig. 35, from the stop #19 on the back of the cam guide #20. Now pull the cam packet frame off the link #21, Fig. 34. The packet frame must

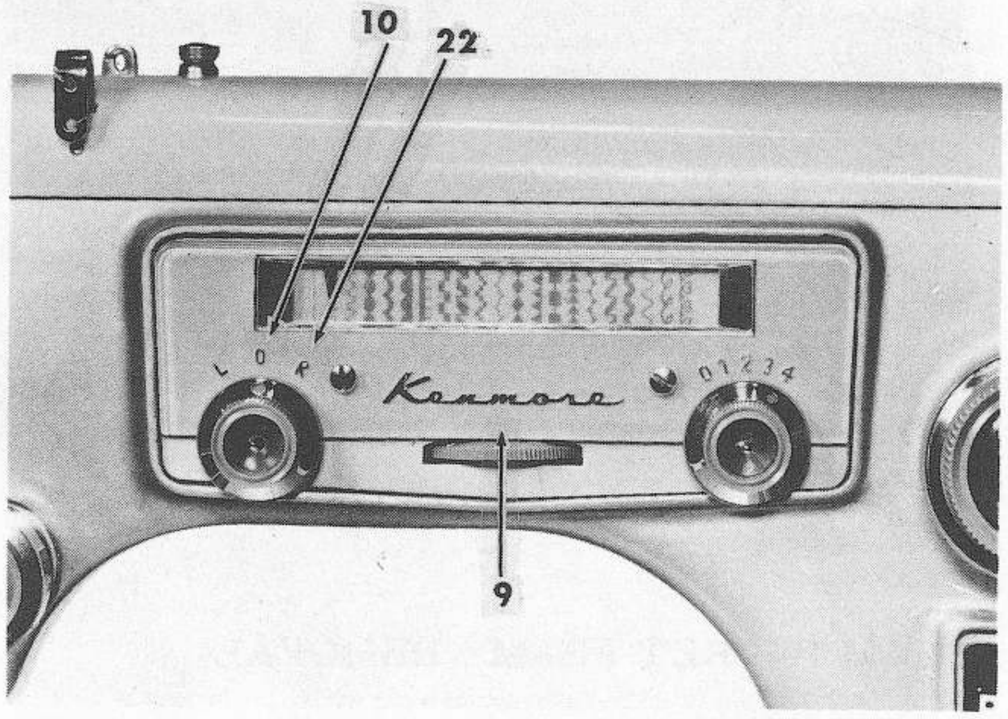


Figure 36

be moved toward the back of the machine somewhat to do this. With an unobstructed view it is now possible to clearly see the adjustments which can be made to change the needle position.

f. While it is not necessary to have removed the cam packet assembly in order to adjust the needle position, it is suggested that this be done the first time in order that a clear view may be obtained. After once having

made this and other adjustments to the machine, it will be found that most adjustments can be made with the cam packet assembly in place.

NEEDLE POSITION CONTROL ADJUSTMENT

a. With the safety glass plate #9 in place, Fig. 36, determine whether the Needle Position Knob, when it is snapped into its center position, is in exact alignment with the zero on the plate. Refer to #10, Fig. 36. If in center position and the Needle Position Control knob is not in alignment with the zero mark on the plate, loosen the stitch positioning shaft locating set screw #23, Fig. 37, and turn the stitch position knob until it is in exact alignment with the center marking, then retighten the set screw #23.

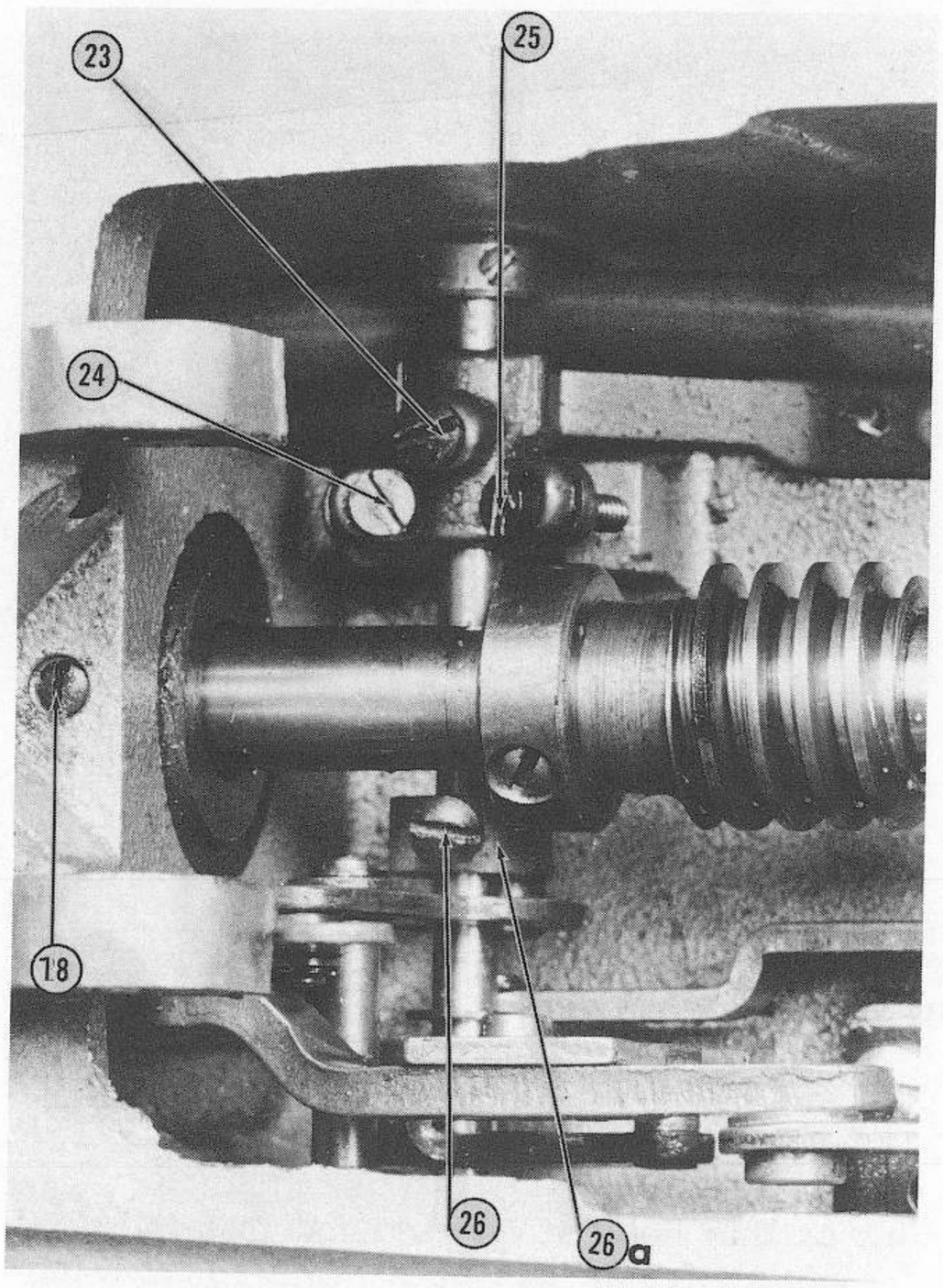


Figure 37

b. Alignment of the stitch Position Control Knob with the left and right markings is accomplished by means of the two limiting screws #24 and #25, Fig. 37. First turn the two screws #24 and #25 up evenly to the point where the heads practically come together. At this point the clearance of the stitch Position Control should now be the same to the left as it is to the right. If the stitch Position Control turns further to one side than the other, loosen the set screw #26, Fig. 37, which holds the clevis #26a to the position control shaft. Turn the clevis #26a to the right or left as necessary so that when the set screw is retightened, the throw of the Position Control Knob will be the same to the left and to the right of center. It may be necessary to repeat the above operation in order to get the same throw of the Position Control in both directions. In making this adjustment care must be exercised that the clevis #26a does not move laterally on the shaft and that the clevis link pin does not drop off the stitch position adjustment fork.

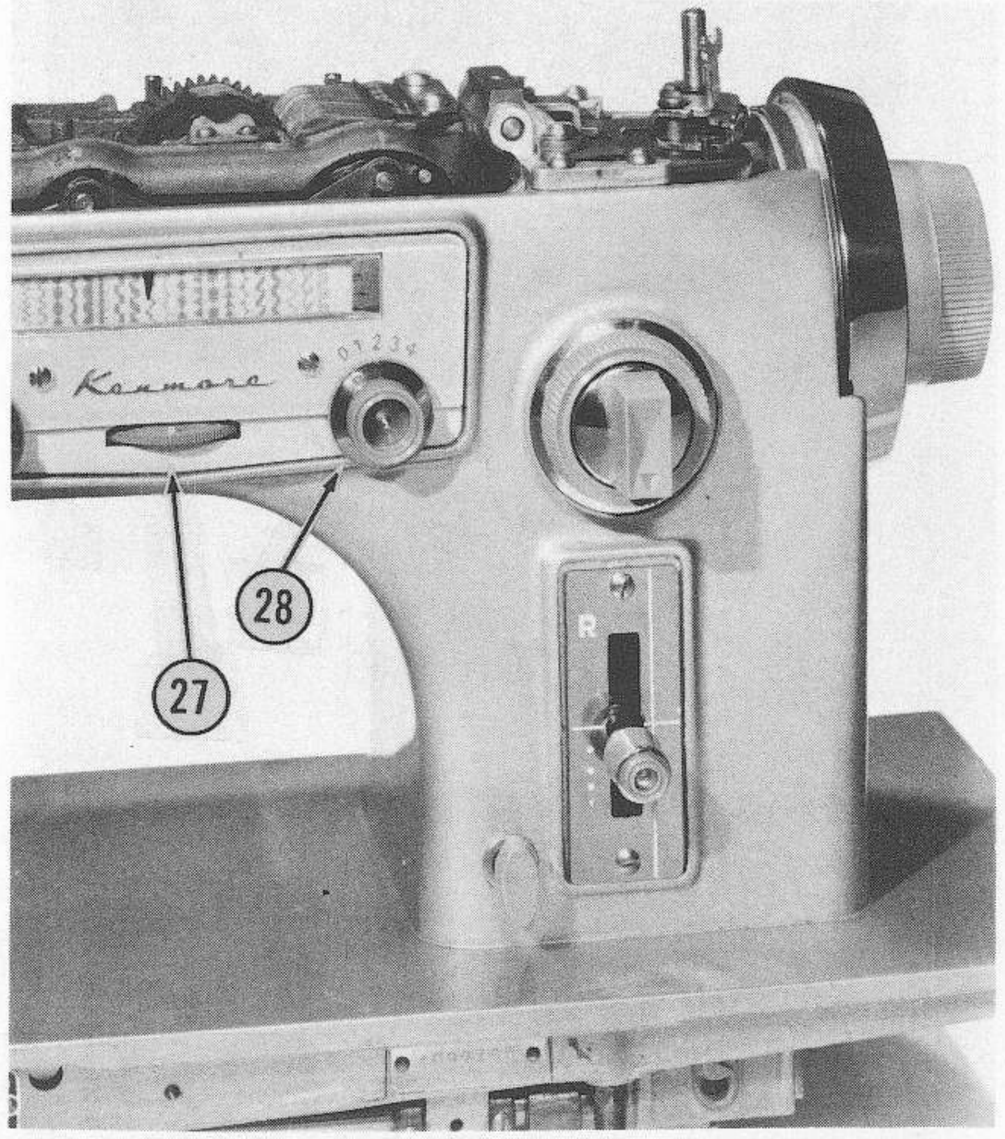


Figure 38

c. Finally set the Position Control Knob all the way to the right, #22 in Fig. 36, then tighten the adjustment screw #25, Fig. 37, to the point where the position knob is in exact alignment with the right hand marking on the needle positioning scale. Now move the Position Control Knob all the way to the left and screw in the adjusting screw #24 to the point where the control knob is in exact alignment with the marking on the left side of the needle position scale. At this point the needle deflection should correspond with the full zigzag width.

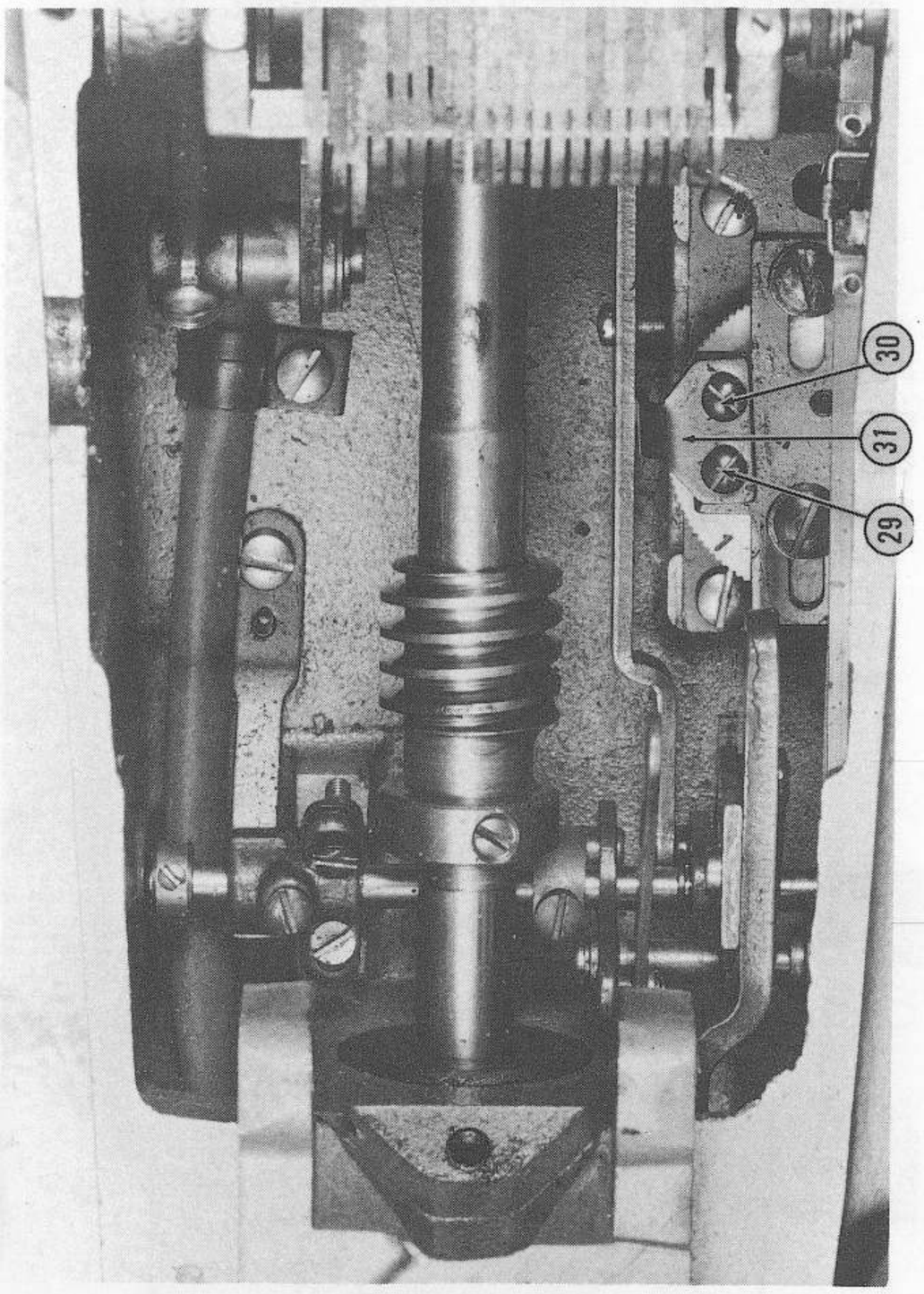


Figure 39

ZIGZAG STITCH WIDTH CONTROL AND WIDTH LOCK ADJUSTMENT

Occasionally it may be noticed that the number indicated on the Stitch Width Lock #27, Fig. 38, does not correspond with the actual zigzag width as indicated, on the Width Control Knob #28. For example the Width Lock may be on #2 and the Width Control Knob somewhere between 2 and 3. To bring the Width Lock into alignment with the Width Control Knob, loosen the two screws #29 and #30, Fig. 39, and set the Width Lock and the zigzag Width Control Knob at 0. Now move the locater part #31, Fig. 39, as far to the right as you can and hold it while the two screws #29 and #30 are retightened.

WIDTH LOCK BUTTONHOLE ADJUSTMENT

Set the stitch Width Lock #27, Fig. 38, at buttonhole (⏥) position. At this point the zigzag Width Control Knob should snap into position 2. There should be a definite feel at position 2 that indicates the Width Control Knob has slipped into position. If, when the width control is felt to snap into position, the control knob does not indicate or register at #2 position, adjustment can be made by loosening the set screw in the stop collar located on the width control shaft just inside the casting. After loosening the screw set the zigzag Width Control Knob at #2 and retighten the set screw.

NOTE: There may be times when making a buttonhole, that the zigzag stitches are too wide, not allowing the cut to be made for the buttonhole without cutting the stitches. Under these circumstances the zigzag stitch width can be narrowed by readjusting the feel position so that it registers at something less than the number 2 position.

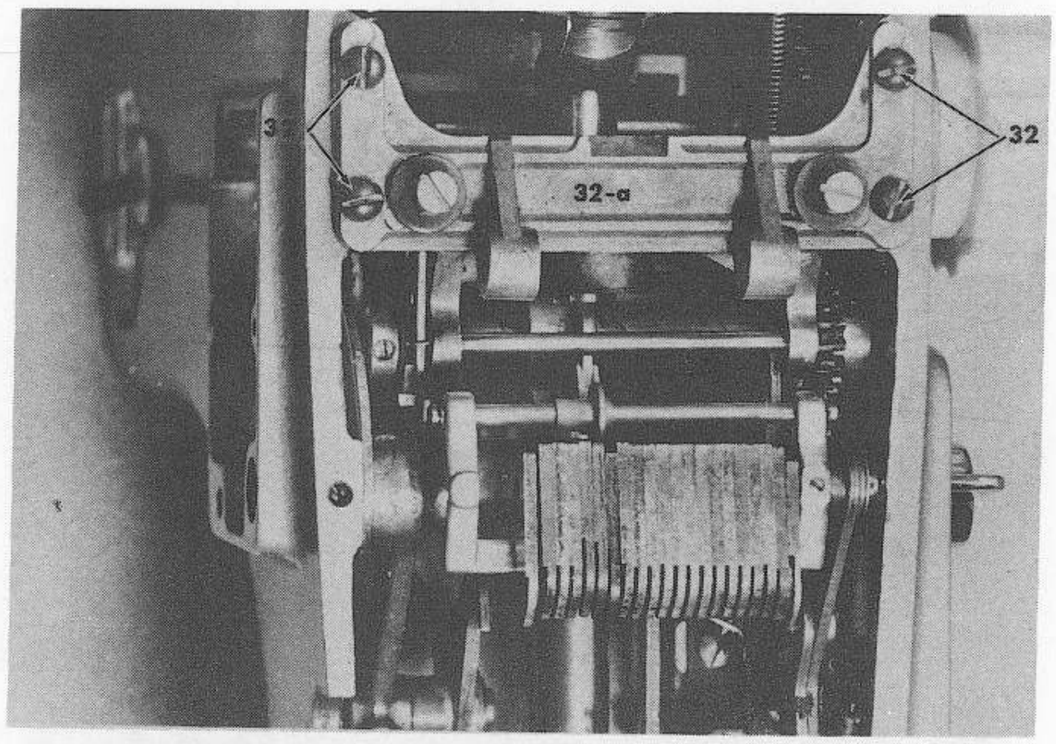


Figure 40

REMOVAL OF THE SWINGING FRAME WITH THE STITCH SLIDE AND FOLLOWER ASSEMBLY

a. Remove the bobbin winder; it is held in place by two screws.

b. At this point it is assumed that the cam packet frame has been removed from the machine. To remove the swinging frame support bracket 32a, Fig. 40, take out the four screws 32. Keep track of any spacers located under the support bracket before lifting out the support bracket; turn the hand wheel until the upper main drive shaft cam, which operates the stitch length forked connection, is in its most down position. Lift the support bracket in a direction up and diagonally to the right.

c. Take out the return spring #33, Fig. 41, located inside the arm. Remove the snap ring, see arrow Fig. 41. This snap ring is on the swinging frame shaft too close to the frame to be easily seen. See the nomenclature exploded view, the claws actually ride on a bushing and this shaft passes through casting, frame and bushing. Next loosen the set screw #34, Fig. 41, in the stop collar. The lever #29 can be disconnected from the swinging frame by loosening the screw in the swinging frame casting and pulling out the stud; do not lose spacer and washers. The set screw #30 in back of casting holds a bushing that the swinging frame shaft rides in; it is not necessary to remove this. For better access to the assembly, remove the sewing light assembly. With a slender tool, push the swinging frame shaft toward the back of the machine until the swinging frame assembly becomes free and can be taken out from above.

REPLACING THE SWINGING FRAME

Reintroduce the swinging frame assembly from the top of the machine. Be sure that the disengaging lever #35, Fig. 41, lies on top of the eccentric bolt #36 which protrudes from the swinging frame as shown in the illustration. Reintroduce the swinging frame shaft from the back of the machine into the swinging frame assembly until it protrudes about 3/16 of an inch at the front of the assembly. Slide the stop collar and washer spacer back onto the shaft while pushing the shaft into place. Push the swinging frame shaft toward the front until it is possible to replace the snap washer in the groove at the front of the shaft. Now slide the shaft back again until the snap washer and spacer washer are up against the swinging frame. While holding the shaft in this position slide the stop collar on the shaft until it is up against the cast housing and retighten the stop collar set screw. After reassembly be sure the swinging frame works smoothly with little end-play, then replace the return spring #33.

REPLACING THE SELECTOR AND SELECTOR SWITCH CONTROLS

To replace the Selector Switch Control 37 and Selector Control #38, Fig. 42, the bobbin winder assembly and the cam support bracket assembly must first be removed as previously described. Detach the return spring #39, Fig. 41. Loosen the two set screws #40 (only one of them is visible on the selector switch shaft eccentric #41 and those on the stop collar). Also loosen the

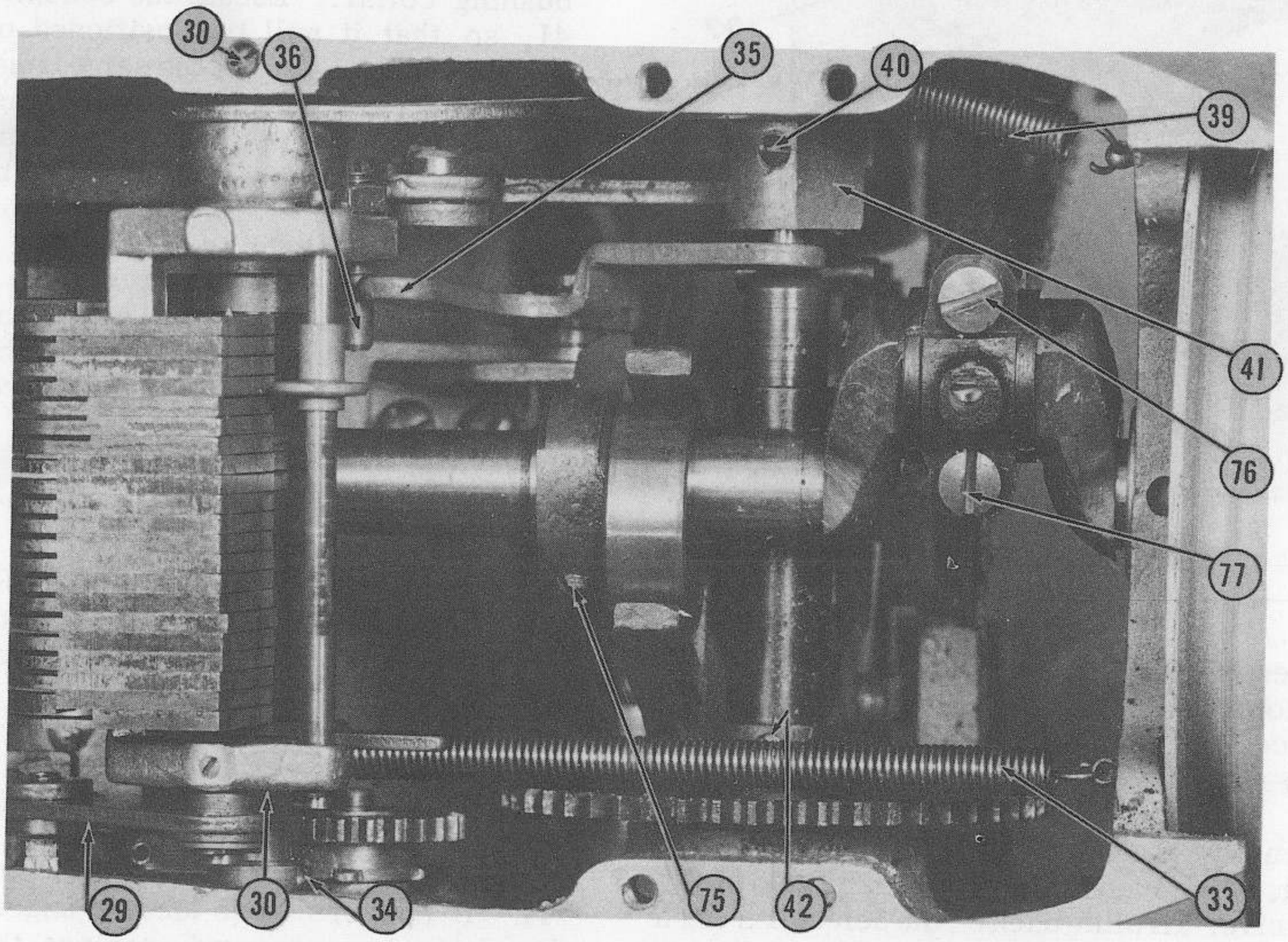


Figure 41

two screws #42 located on the spring bushing collar at the front of the machine. Next remove the two snap washers; one is located on the shaft between the selector knob sleeve and the spring bushing collar, the other at the end of the selector switch shaft on the outside of the housing (see #43 Fig. 43). It is suggested that the selector controls and shafts be pushed out from the back of the machine using a long slender screw driver. In this way the screw driver can take the place of the shaft as the shaft is being pulled toward the front in order to keep the various parts from falling down into the machine. To separate the switch knob from the selector simply remove the snap ring. The selector pressure spring will fall out; be sure to keep track of it and replace it in the same position on the assembly. See nomenclature exploded view. Reassemble the selector and selector switch controls in the reverse order.

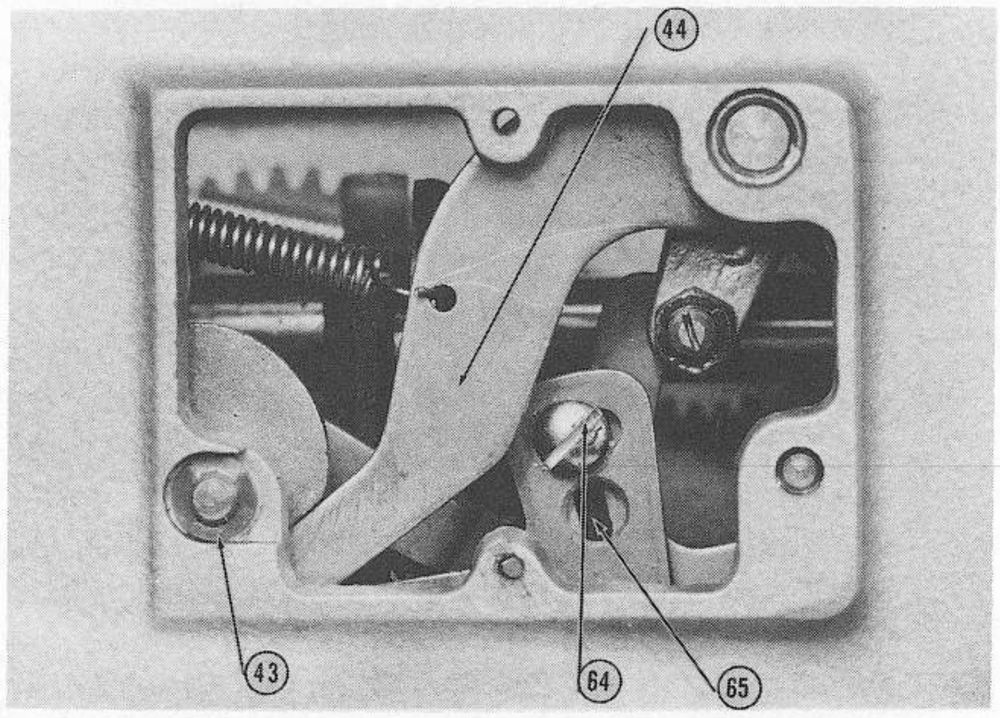


Figure 43

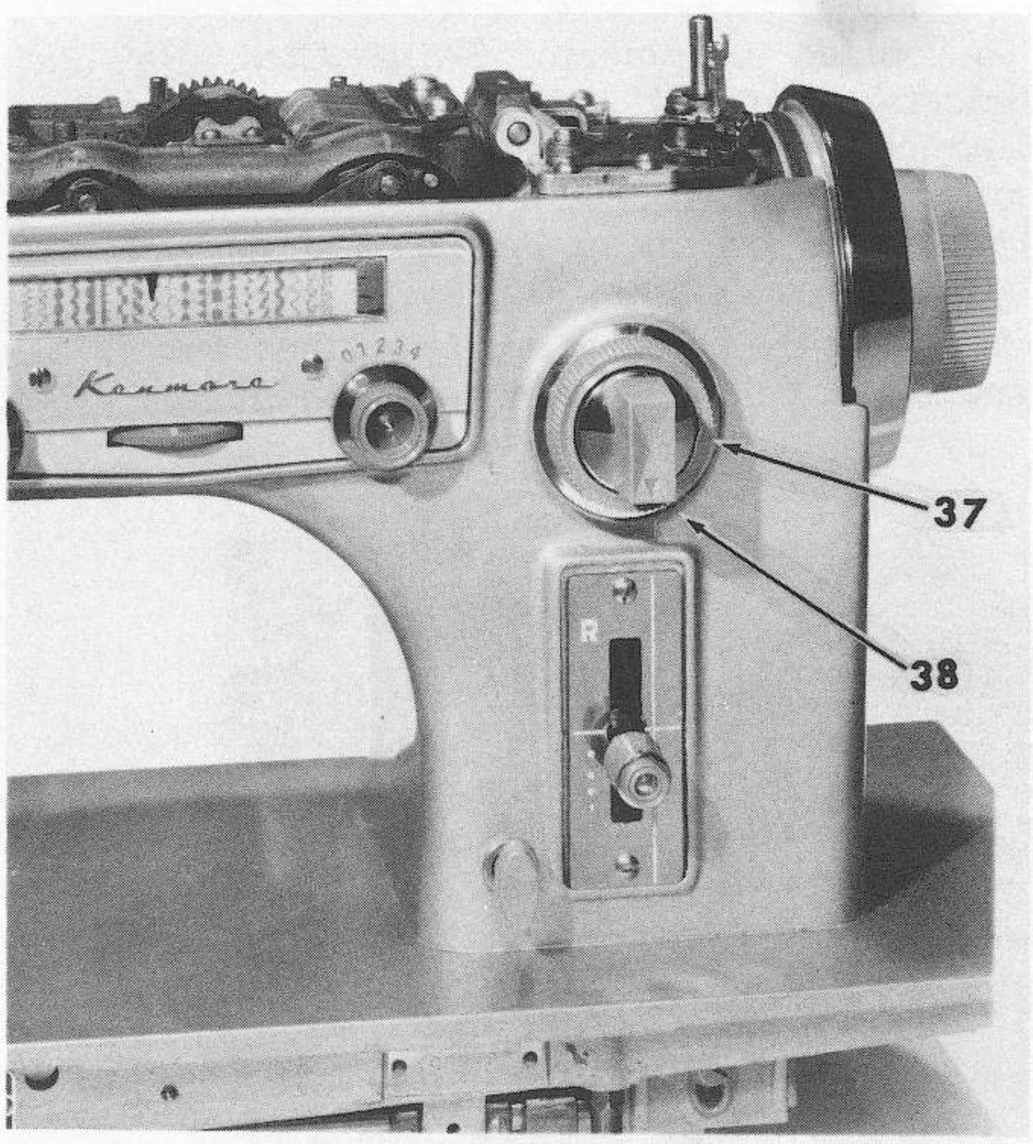


Figure 42

First reassemble the selector and selector switch controls sliding the pressure spring back into place and hold them together by means of the snap ring.

Introduce the selector assembly back into the machine, being careful that the parts held by the screw driver all slide back on the selector switch shaft. Put the two snap rings back into place, one at the selector sleeve location and the other at the end of the selector switch shaft (see #43 Fig. 43). The stop collar should now be located on the selector switch shaft between the eccentric #41 and the back of the machine. Adjust for a minimum of shaft endplay and retighten the stop collar set screws. Replace the return spring 39, Fig. 41, then move the spring bushing towards the front of the machine and the selector gear as far as it will go and retighten the set screws in the bushing collar. Locate the eccentric #41, Fig. 41, so that it will be positioned on top of the lever #44, Fig. 43. At the same time make sure the eccentric is adjusted laterally as close to the lever 35, Fig. 41, as possible and still allow this lever to go by the eccentric with clearance. Check to be sure that the red indicator on the selector switch knob is in the down position and then tighten the set screw visible near the top of the eccentric. Turn the switch knob until the second set screw is visible and tighten it. Both controls should now be in the correct position.

CAM BRACKET ASSEMBLY REPLACEMENT

When replacing the cam bracket assembly #32a, Fig. 44, it should be directed into the top of the machine at an angle toward the cam claw follower assembly, the claw selector disc #45, Fig. 44, must be engaged properly by the claw selector disc positioner #46. At the same time the gears must be engaged carefully to see that they match correctly. The support bracket can now be screwed into place with the four screws 32, Fig. 44. If spacers were located under the support bracket when removed, replace them in order that proper clearance will be provided on that particular machine.

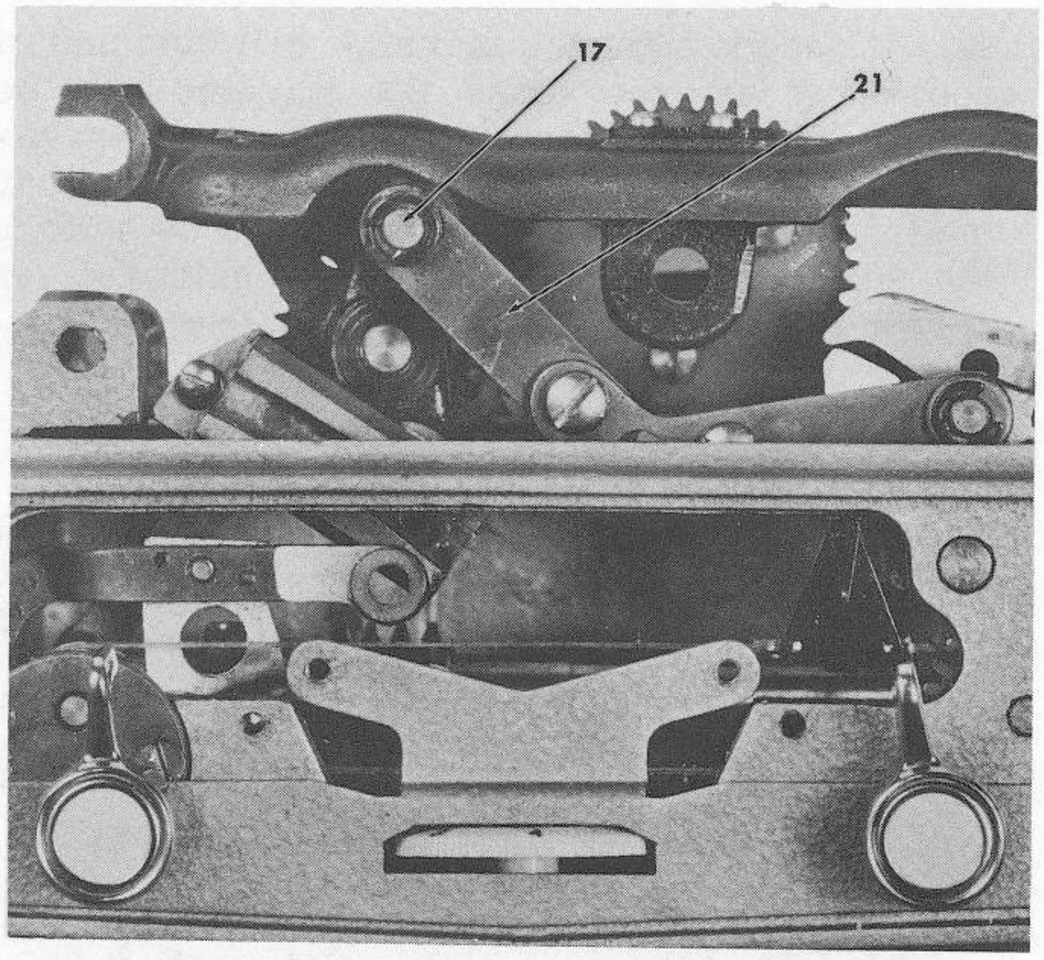


Figure 46

CLAW SELECTOR DISC POSITIONER ADJUSTMENT

Notice that the cam selector control clicks as you turn it, the selector disc should be in the center of a claw follower at each click. If adjustment is necessary proceed as follows: First loosen the two set screws #48, Fig. 44, in the indicator stop detent collar. Now by turning the selector control knob either a little to the left or

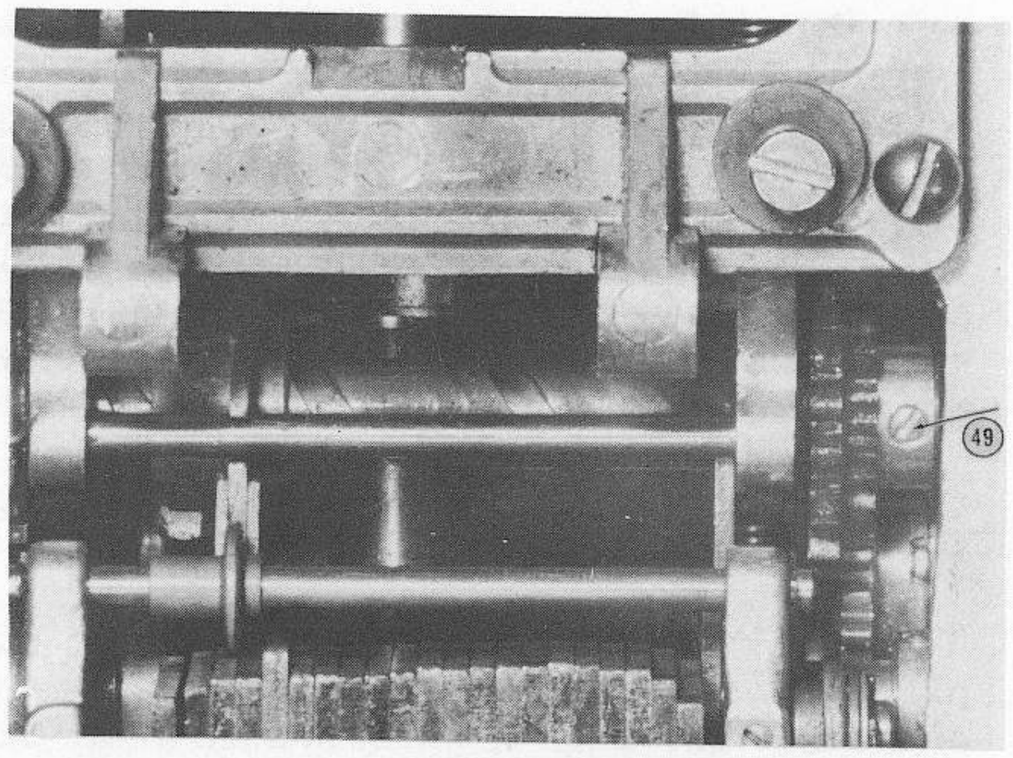


Figure 45

to the right, the claw selector disc can be moved until it centers exactly in relation to one of the cam claw followers. Finally retighten the set screws in the indicator detent collar.

PATTERN INDICATOR ARROW ALIGNMENT

Loosen the two set screws in the gear collar #49, Fig. 45. Both screws will become visible on turning the cam selector knob. Be sure both screws are adequately loose; however, do not turn them out so far that they drop through the machine and are lost. Now turn the cam selector control knob to the right as far as it will go

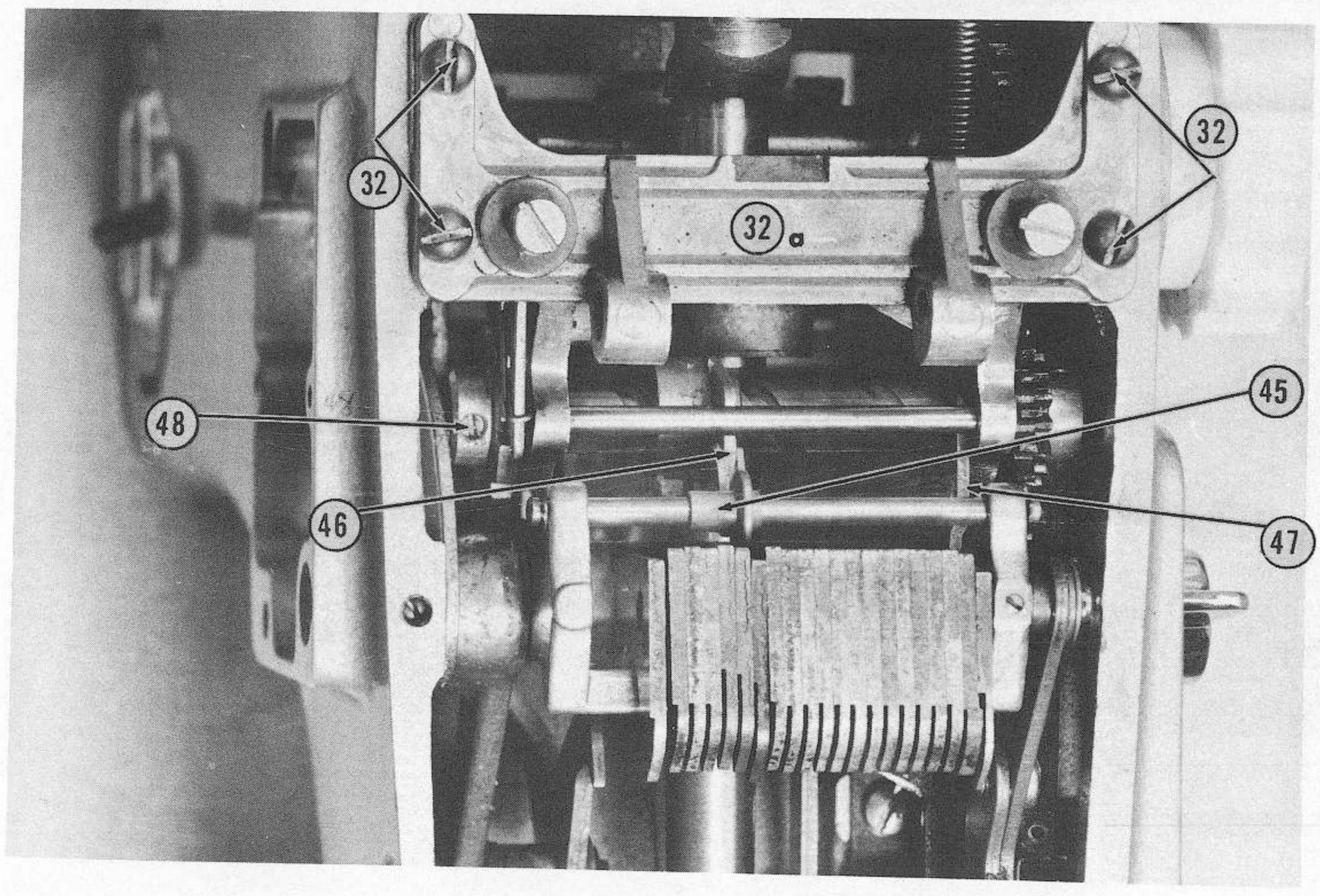


Figure 44

even though it may turn a little difficult at the extreme right position. Then turn the selector control knob back all the way to the left until the arrow clicks in right over the straight stitch mark, retighten the two set screws in the gear hub 49, Fig. 45. If the arrow should still be slightly off the mark, this may be corrected by moving the indicator dial a little to one side or to the other.

CAM PACKET FRAME ASSEMBLY REPLACEMENT

Take the safety glass plate off the machine and place the cam packet frame housing into the top of the machine from the back in such a way that the connecting lever 21, Fig. 46, can be slipped over the shaft 17. In continuing to insert the frame, twist it slightly so that the stud #19, Fig. 47, in the slide housing #20 can be engaged into the lever #18. Care will need to be exercised as the frame is worked down into the housing in order that this connecting lever does not slip off the stud. Replace the snap ring #17, Fig. 46, and replace the shafts #5 and #6, Fig. 49, from the back of the machine. The eccentric shaft #5 should be adjusted for proper clearance between the drive worm and worm gear #50 and #51, Fig. 48. If set too tight the machine will bind and of course if set too loose the machine will be noisy. Once the frame is in place and engagement of the worm to worm gear is properly made, tighten the set screws #3 and #4 holding the shafts #5 and #6, Fig. 49. Finally the cap screw #13, Fig. 51, holding the stitch width linkage to the slide can be replaced.

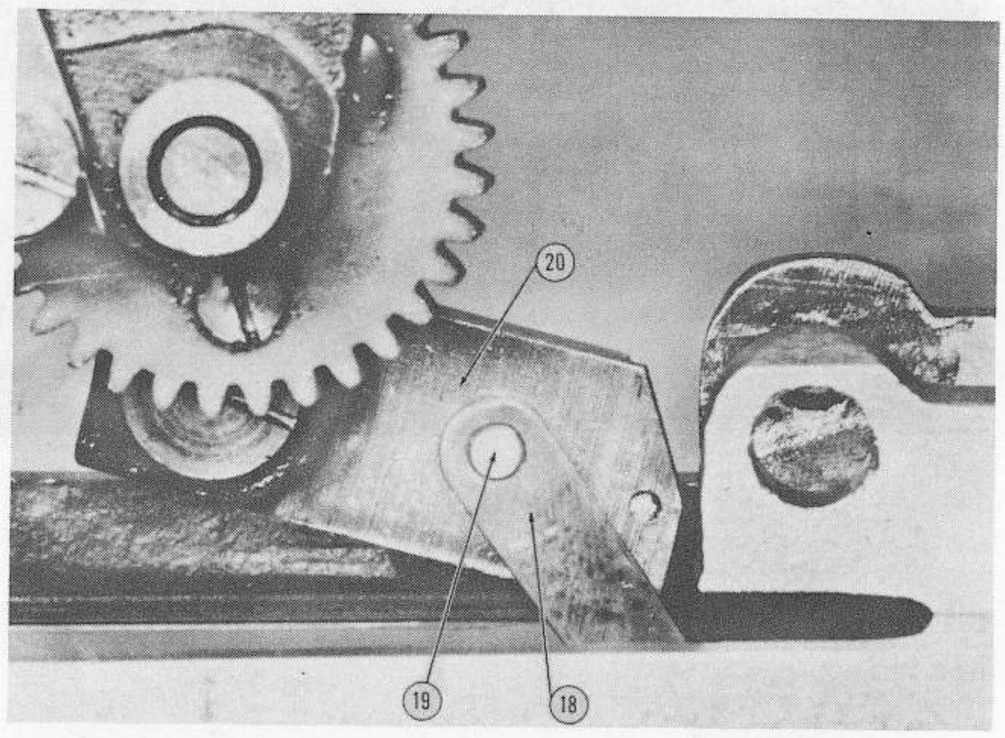


Figure 47

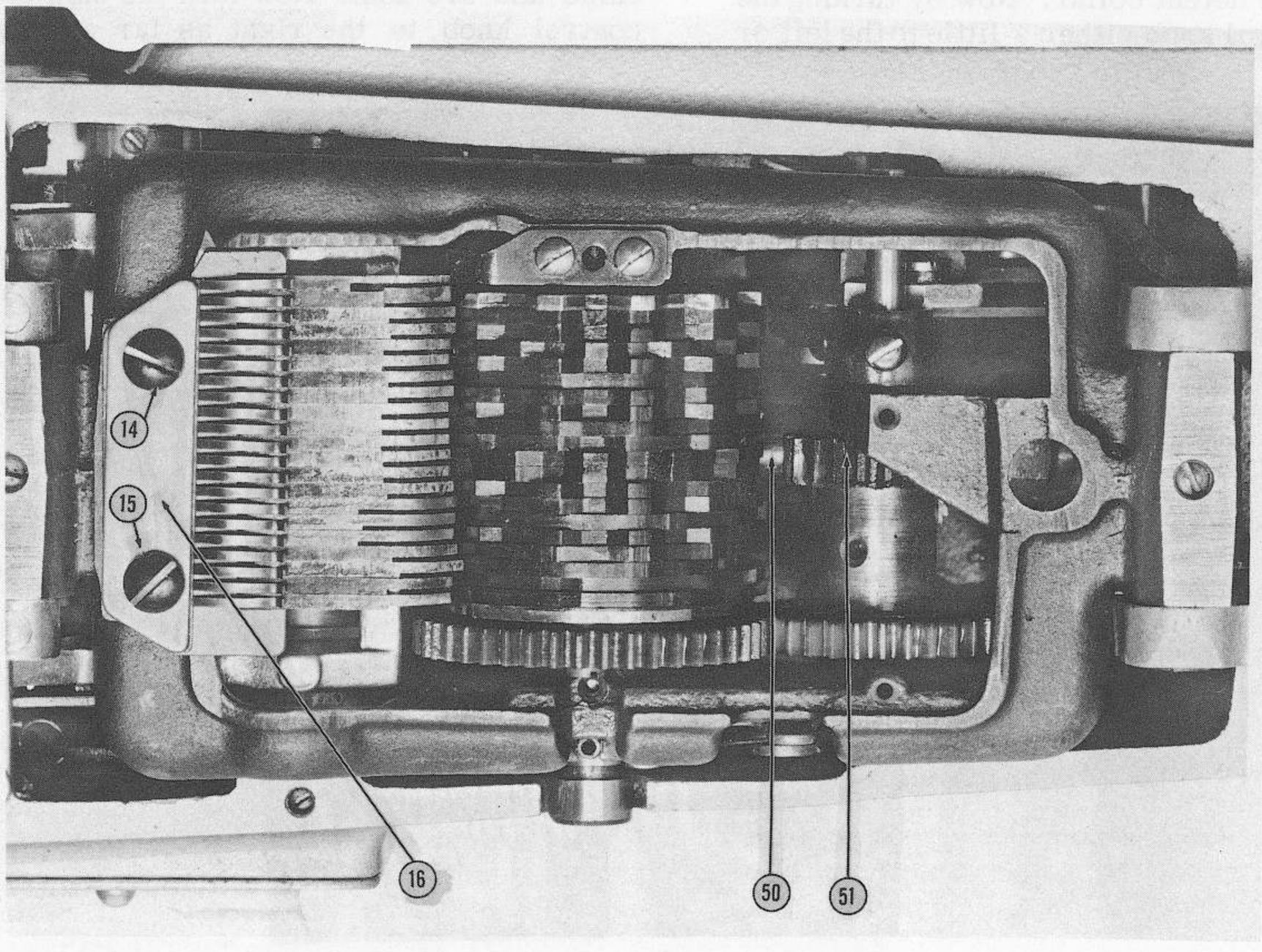


Figure 48

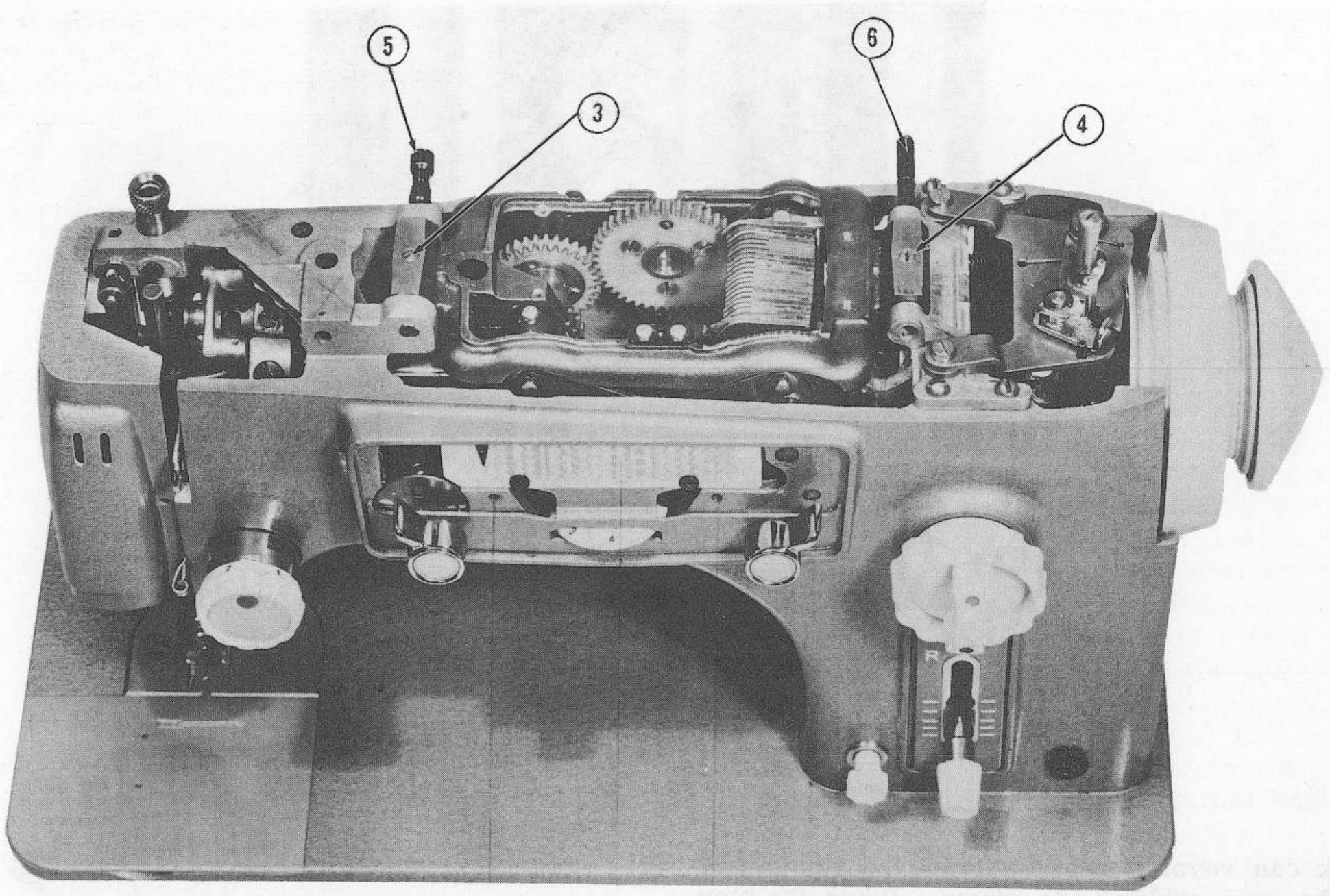


Figure 49

CAM PACKET REPLACEMENT. See Fig. 29

The cam packet is replaced in reverse order to its removal

a. First be sure that the machine is set for straight stitching. Turn the stitch selector control to indicate straight stitch setting. Then turn the cam packet drive gear until the driving screw is located at the top on the back.

b. With cam #21 (so labeled on packet) toward the back of the machine, place the cam packet on the cam lifter tool in such a way that the oval hole in the cam (not the round one) is up. Now introduce the cam packet to the frame. Align the cam packet with the frame and replace the cam shaft using the puller tool from the back of the machine. Push it in toward the front, being sure that the key in the shaft fits into the slot in the cam packet bushing. If the cam packet swinging frame and finally the cam packet assembly has been properly replaced, the hand wheel will turn over freely and the selector knob will work easily as the indicator is turned from one side of the indicator dial to the other.

REPLACEMENT OF THE CAM CLAW FOLLOWERS STOP PLATE.

Refer to Fig. 48. Place the stop plate #16 on the cam frame holding the plate in such fashion that the claw followers are forced toward the cam packet assembly, then replace the two screws 14 and 15 but leave them slightly loose in order that the plate position can be altered.

To check cam packet to claw clearance, first be sure that the driving screw on the back of the cam packet gear has not been screwed into the cam packet so that the packet may be turned over freely by hand.

Next rotate the cam packet by hand and watch the clearance between the cams and the claws. The stop plate may have to be moved back slightly to allow proper clearance. At the highest point on the cams the clearance between the claw followers and the cams should be 4 or 5 thousands of an inch. For a final check push in on the cam selector control and move the pattern indicator back and forth across the dial, at the same time watching that the claw followers do not touch the high points of the cam.

It will also be necessary to watch the operation of the selector disc #45, Fig. 44, to be sure it does not catch on either of the claw followers at the back. The stop plate must be so positioned that the selector disc can move freely in back of the claws without touching them and the cam

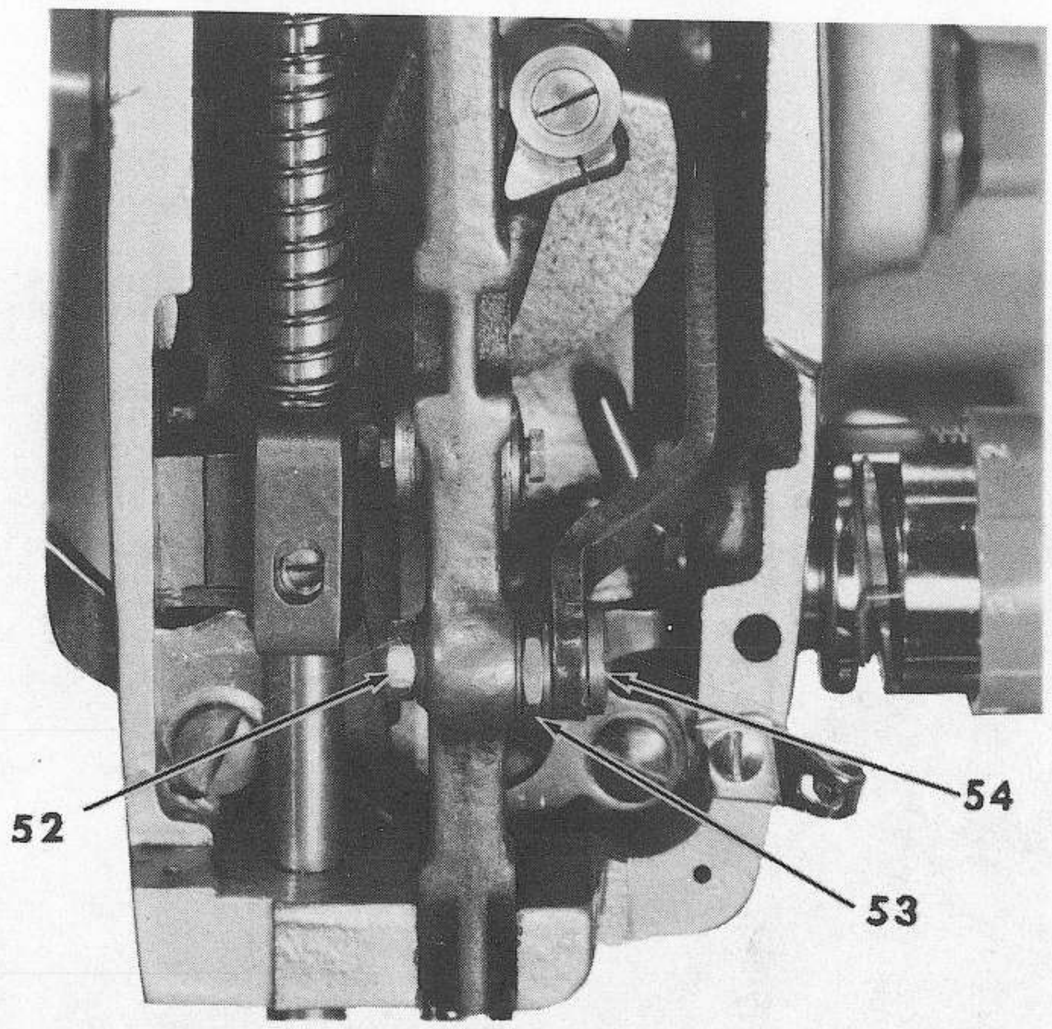


Figure 50

pack can revolve freely without the high points of the cam rubbing the claws. When the stop plate has been so adjusted, tighten the two screws #14 and #15 securely, Fig. 48.

To realign the indicator with the stitch pattern indicator plate, replace the pattern indicator plate, holding it lightly with the two screws. Now turn the selector knob to the left until the indicator arrow is in alignment with the straight stitch marking. If the arrow is not in exact alignment with the straight stitch marking, correction may be made by moving the plate slightly sideways and then tighten the plate holding screws.

CHECKING AND ADJUSTMENT OF THE NEEDLE POSITION.

With the Pattern indicator, set the zigzag marking. Be sure the selector knob is pulled out. Then set the needle Position Control on the center position. Place the zigzag stitch Width Control all the way to the left or on zero. At this point the needle should be exactly in the middle of the elongated needle hole.

If adjustment should be necessary, in order to center the needle, loosen the hexagonal lock nut #52, Figure 50, and move the eccentric #52 either to the left or to the right until the needle does center in the elongated needle hole. Then with a screw driver holding the screw 54, retighten the hexagonal nut.

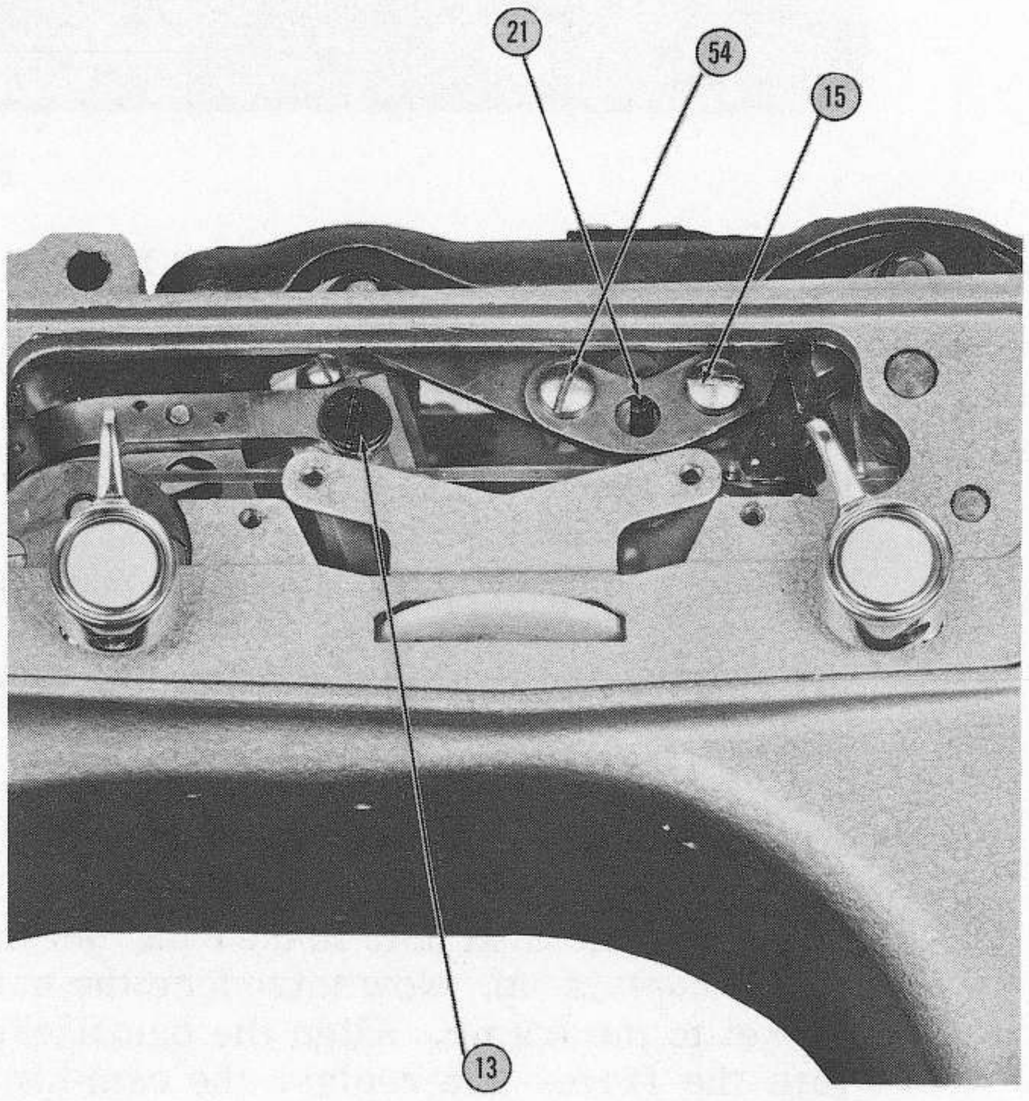


Figure 51

Set the Stitch Width Lock control dial at #4 and turn the zigzag Stitch Width Control knob all the way to the right. Now by turning the hand wheel towards you the needle should enter the needle hole to the extreme left position. Continuing to turn the hand wheel, the needle should swing from one side of the elongated hole to the other. The clearance should be the same on both sides.

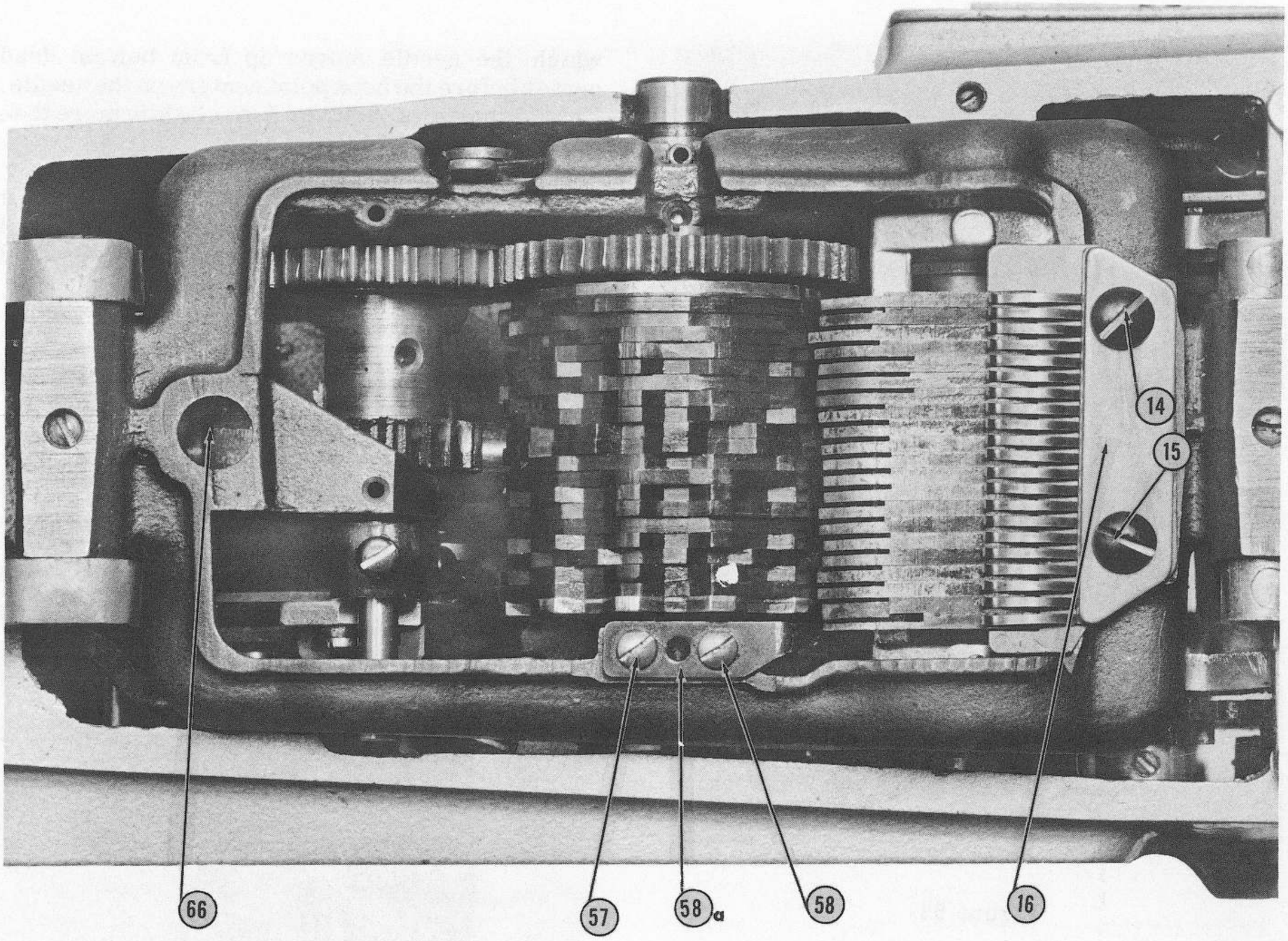


Figure 52

If this is not the case adjust as follows: Remove the stitch pattern indicator plate and loosen the two screws #54 and #55, Fig. 51, slightly. Put the eccentric key tool or a small screw driver into the center slotted opening of the connecting lever #21, Fig. 51. By turning the key or swiveling the screw driver to the left and to the right, the relations between the two connecting levers can be changed until the clearance of the needle is the same in the elongated hole on the left and on the right. When this has been established retighten the two screws #54 and #55, Fig. 51. Replace indicator dial and the safety glass plate.

ADJUSTING THE MACHINE FOR EXACT STRAIGHT STITCH

Set the pattern indicator arrow on the straight stitch marking and the needle Position Control on the center marking. Move the needle into the needle hole with the hand wheel. In moving the zigzag Width Control from 0 to 4 and back, the needle should not move either to the left or to the right. If it should move, adjust as follows: Loosen the two screws, #57 and #58, Fig. 52. Move the straight stitch stop plate #58a, Fig. 52, either to the left or to the right as necessary until the needle no longer moves as the zigzag width Control knob is changed in position. Retighten the stitch stop plate hold down screws.

CHECKING AND ADJUSTING LEFT AND RIGHT NEEDLE DEFLECTION

Place the Needle Position Control lever on the left marking and turn the hand wheel until the needle enters the needle hole. Set the pattern indicator on zigzag position. Now when turning the stitch Width Control Knob from 0 to 4 and back, the needle should remain stationary. First, if it should move all the way across the needle hole, continue to turn the hand wheel once more until the needle again enters the needle hole and then repeat moving of the zigzag stitch Width Control Knob from one side to the other. Now with the needle positioned on the left side of the

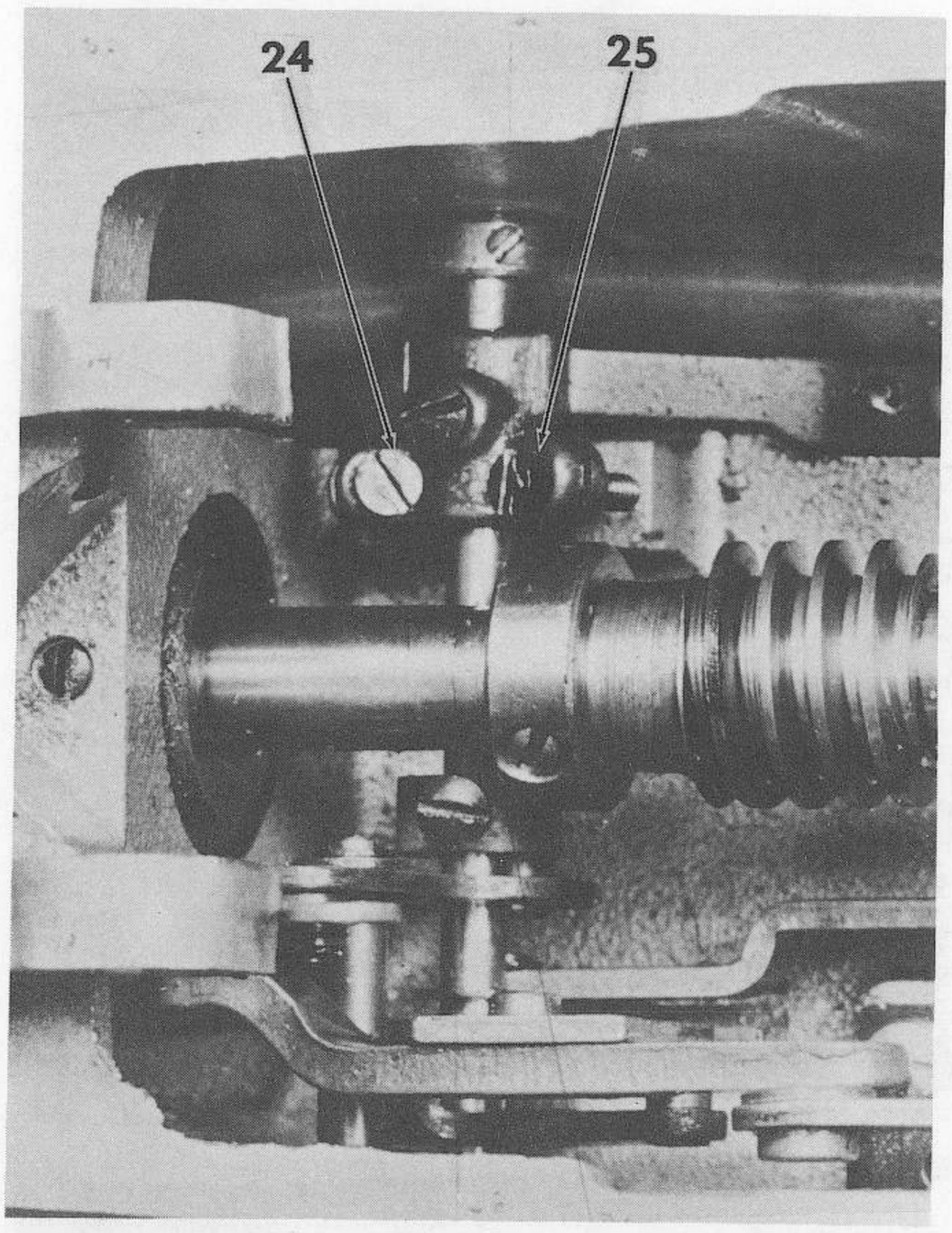


Figure 53

needle hole, if moving the stitch Width Control lever back and forth does cause the needle to move a little sidewise, this can be corrected by adjusting screw #24, Fig. 53, until the needle is stationary. As you adjust the screw, make sure that the needle Position Control Knob remains turned to the left side as far as it will go. Repeat the same procedure for adjusting needle deflection on the right side position. Use screw #25, Fig. 53.

The adjustment of the needle position and adjustment for exact straight stitching and adjustment for left and right needle deflection are somewhat inter-related.

For this reason it may be necessary to repeat these various operations to some extent in order to obtain needle bight function.

ROTATIONAL TIMING OR THREAD LOOP ADJUSTMENT

By rotational timing is meant the adjustments of the shuttle hook so that the hook point centers at the right distance above the eye and in correct timing with the motion of the needle itself. This is also called "thread loop" which is the distance

which the needle moves up from bottom dead center before the hook point centers on the needle. This distance is .098" or just slightly more than 3/32". See Fig. 54.

Rotate the hand wheel until the needle bar is at its lowest position. The needle Position Control should be on center and the zigzag Width Control Knob at zero.

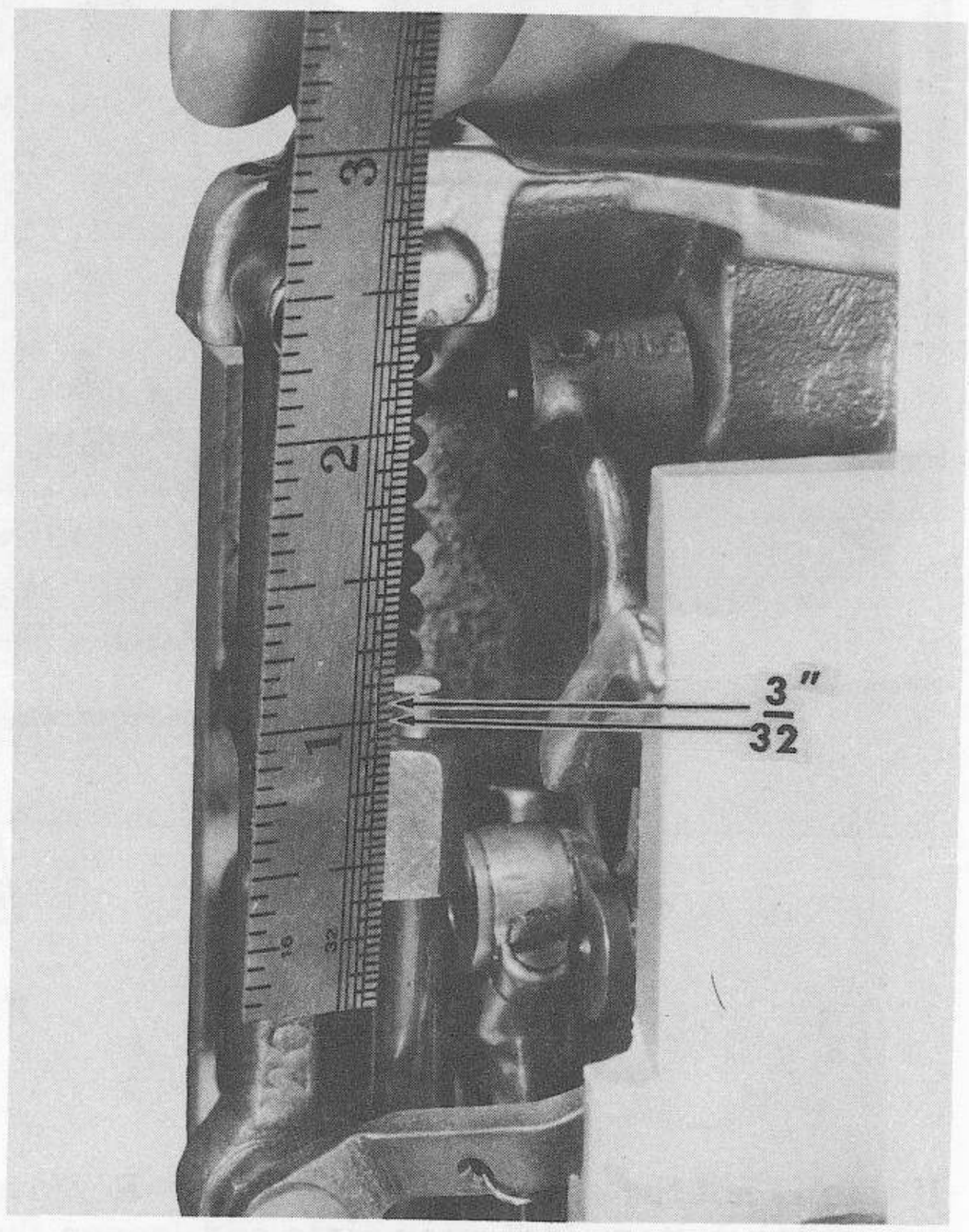


Figure 54

Rotational timing must not be confused with the timing of the needle bar stroke. To repeat, when shuttle rotation is correctly timed, the shuttle point should be at the center of the needle when the needle bar has been moved up 98 thousands or just slightly more than 3/32nd's of an inch from bottom dead center. This dimension may be read using any reference point along the needle bar at which the scale can be conveniently observed.

NEEDLE BAR STROKE TIMING OR ADJUSTMENTS

The needle bar may be set in either too high or too low a position. To check this do the following: Set the zigzag stitch width Control at #4 position. Turn the hand wheel towards you until the needle enters the needle hole on the right side. With the needle bar in this position turn

the hand wheel until the shuttle hook point is in exact alignment with the right side of the needle. In this position the point of the shuttle hook should be on the same level as the upper edge of the needle eye. If adjustment is required, loosen the set screw #61, Fig. 55, and move the needle bar up or down as necessary, being careful not to rotate the bar, until the right relation of the shuttle hook point to the needle eye is obtained. Retighten the set screw #61, Fig. 55, firmly. Of course, for this operation it is assumed that the needle has been correctly seated all the way into the needle clamp.

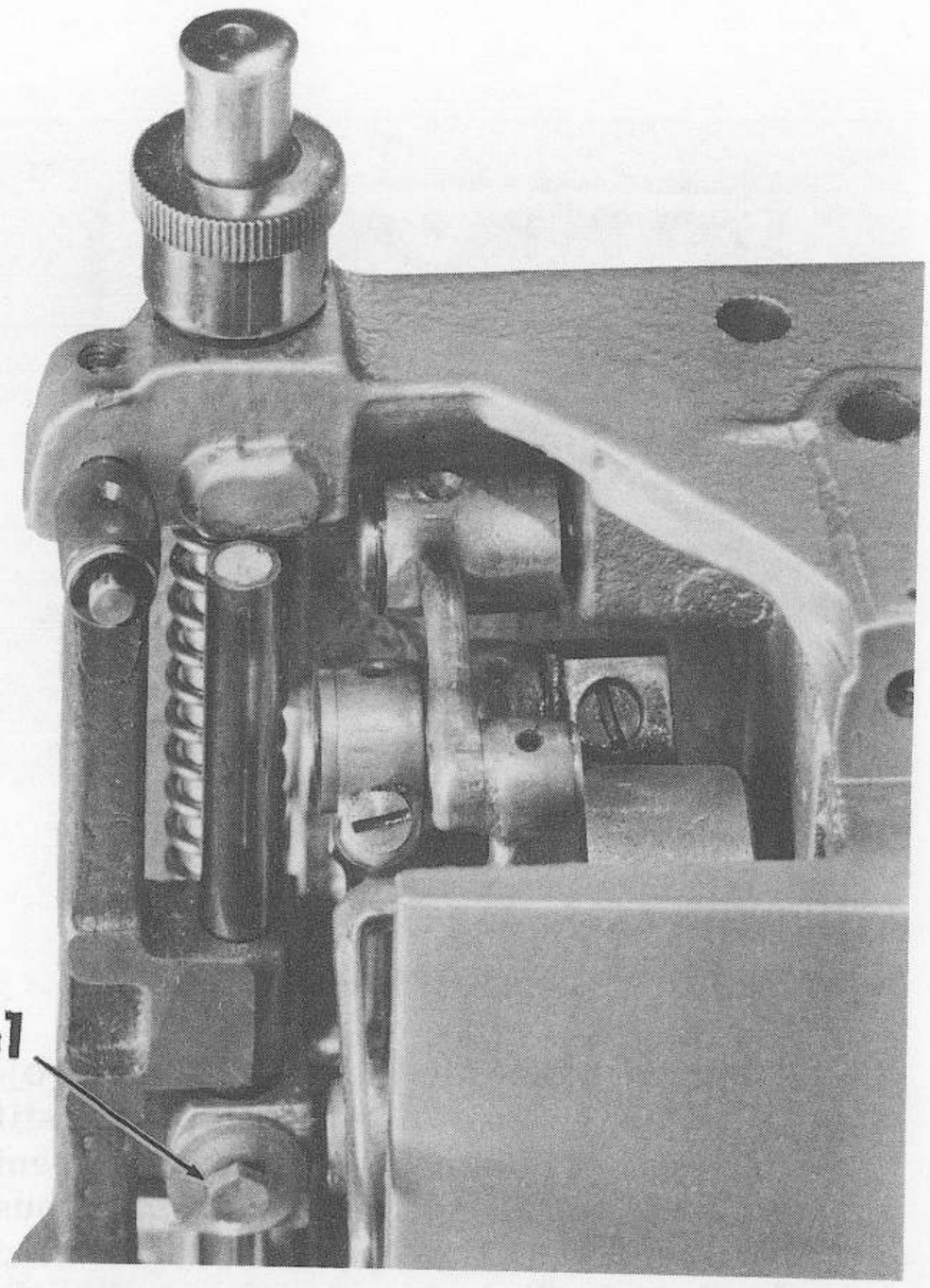


Figure 55

SETTING THE FEED LIFTING ECCENTRIC

The feed lifting eccentric #62, Fig. 56, is so adjusted that the feed dog stops its upward motion from the moment it starts to go forward. This may be adjusted by loosening the two screws in the eccentric and turning it on the shaft as necessary. Never attempt to adjust the feed mechanicism by changing the location of the feed cam on the upper main shaft. The location of this part on the circumference of the shaft is carefully determined in manufacture and to change this location could upset main shaft balance.

Figure 56

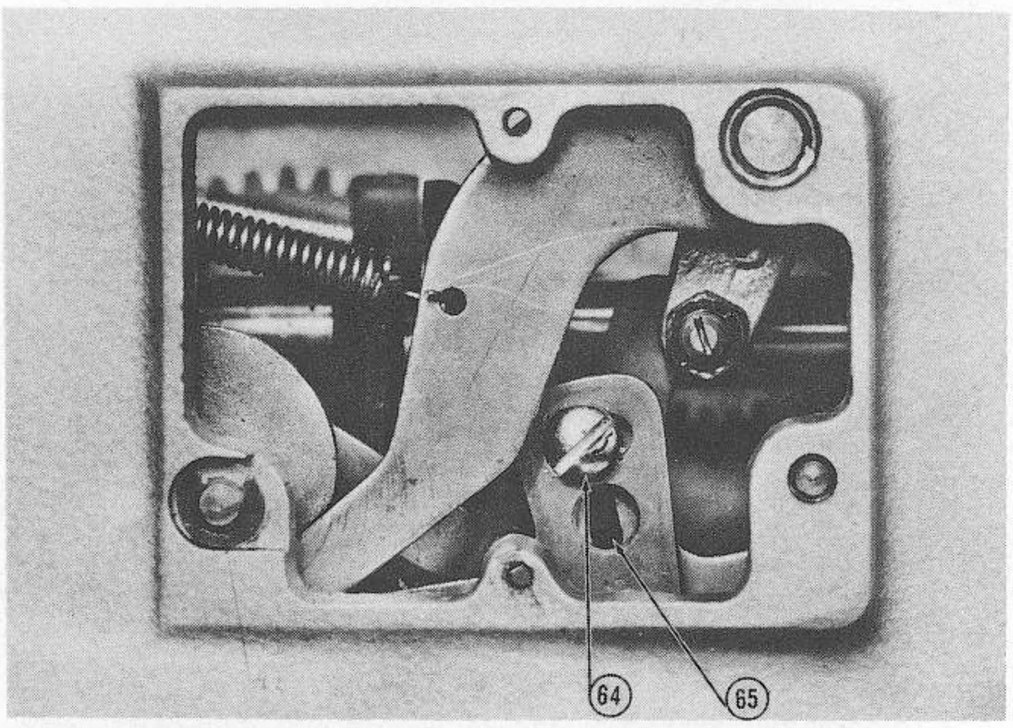


Figure 57

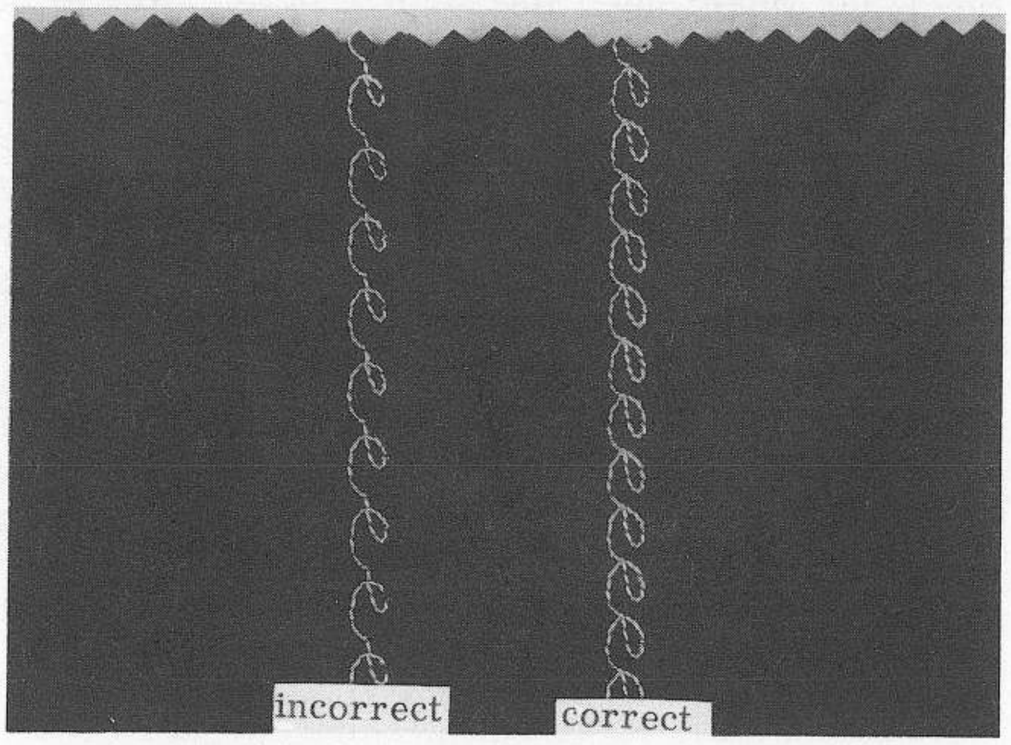


Figure 58

THE FEED DOG HEIGHT ADJUSTMENT

At its highest point the feed dog should project approximately 1/32nd of an inch above the stitch plate. Height adjustment is made by loosening the hexagonal nut and turning the eccentric bushing #63, Fig. 56, until proper feed dog lift is obtained. Poor feeding of material and stitch formation is apt to result from the feed dog being set either too low or too high.

REVERSE DECORATIVE STITCHING ADJUSTMENT

To adjust for the proper formation of the curved pattern, shown in red on the dial, do the following: Remove the lamp and spool pin assembly from the back of the machine. If after trial, and carefully following the instructions to the customer for forming this type of stitch, the pattern is not as pictured, first loosen the screw #64, Fig. 57. Second, either with a small screw driver or the eccentric setting key, adjust the lever linkage at #65, Fig. 57, by placing the screw driver or key into the sloted opening and moving it around to the left or to the right until the lines of the zigzag pattern cross at the proper place (see Fig. 58). After proper stitch formation has been obtained, retighten the set screw firmly and replace the lamp and spool pin assembly.

STITCH LENGTH ADJUSTMENT

With the stitch length indicator centered on the white line of the plate or zero, if the dial were numbered, there should be practically no forward feed motion, meaning the stitches would repeat on top of each other. If the stitching does not zero in at this point on the indicator plate, loosen the two screws holding the plate to the arm and adjust the plate and the stitch length control until the stitching is zeroed in at this point. After adjustment, retighten the two screws firmly.

ADJUSTMENT OF THE ZIGZAG OR DECORATOR STITCH FORMATION

If the formation of the zigzag or decorator stitch is not symmetrical, adjust as follows: Loosen the two set screws in the cam packet assembly drive worm located on the main shaft. Place the pattern indicator on the zigzag stitch marking and turn the hand wheel until the needle bar is at its lowest position. Rotate the cam packet until the claw follower on the zigzag cam rests exactly in the center or the high point of one of the projections on the cam, then holding the cam packet firmly in this position, use a screw driver and turn the worm until the worm gear is about in the center of the worm. At this point tighten all of the set screws holding the worm to the main shaft, then turn the hand wheel until the second set screw is visible and tighten it securely.

REMOVAL OF THE PATTERN INDICATOR ARROW CARRYING BAND OR STRIP

1. Take off top cover.
2. Remove the safety plate.
3. Remove the screws holding the pattern indicator plate and take off the plate.
4. Also remove the support plate to which the pattern indicator dial or plate was attached.
5. Remove the arrow from the band and pull out the wire connector hook going through the band at each end. Remove the band if necessary.

REPLACEMENT OF THE BAND

Two steel wires, one shorter than the other, are used as special tools in replacing this carrying band. See Fig. 29a. First use the long wire and introduce the hook end first from the right front, feeding it towards the left between the bobbin winder and the housing in such a way that the end of the wire will appear underneath the gear wheel with the detent stop on which the carrying band will ride. Now place the hook end of the wire into the loop at one end of the band, making sure that the grooves on the arrow carrying band are on the right hand side and visible from the machine front. Then pull the steel wire with the arrow carrying band toward the right until the band appears in the front opening. Remove the wire tool from the loop and hold onto the carrying band. Next place the same long steel wire hook end first from the left front feeding toward the right, through the indicator plate opening this time, however, leading it above the gear wheel with the indent stop, so that the hook of the wire comes out at the right end of the arrow carrying band. Place the band loop on the wire end hook and pull the carrying band with the wire to the left, leaving the wire hooked in. Using the short special steel wire, introduce the hook end of the wire from the top left side of the machine, directing it from top down under the bearing on which the band will ride, and out the front opening. Now place hooked end through the loop in the band and pull the band all the way through and around the bearing. Now both ends of the arrow carrying band may be joined together by introducing the wire connector from the back of the band through the two band loops. Insert the connector hook ends through the arrow in such a way that the flange or hinge part lies underneath the arrow and passes under the connector hook. After the hinge is so positioned and the two ends of the loop are through the band loops, fold the flange or hinge over the connector and press together to lock the connector hook in place. Now the pattern indicator support plate dial and safety glass plate can be replaced on the machine.

ADJUSTMENT OF THE PATTERN INDICATOR ARROW FOR CORRECT READING

To correct the reading of the pattern indicator, loosen the two set screws (see #49, Fig. 59, holding the gear to the pattern selector worm (this gear is located at the top directly in back of the front of the casting). Rotate the Cam Selector Knob to the right as far as possible; it may turn a little hard at the right end of the turn. Now reverse the direction of turn by going all the way to the left until the indicator arrow snaps in place just above the straight stitch marking. When this position has been obtained, retighten the set screws in the gear hub. If the

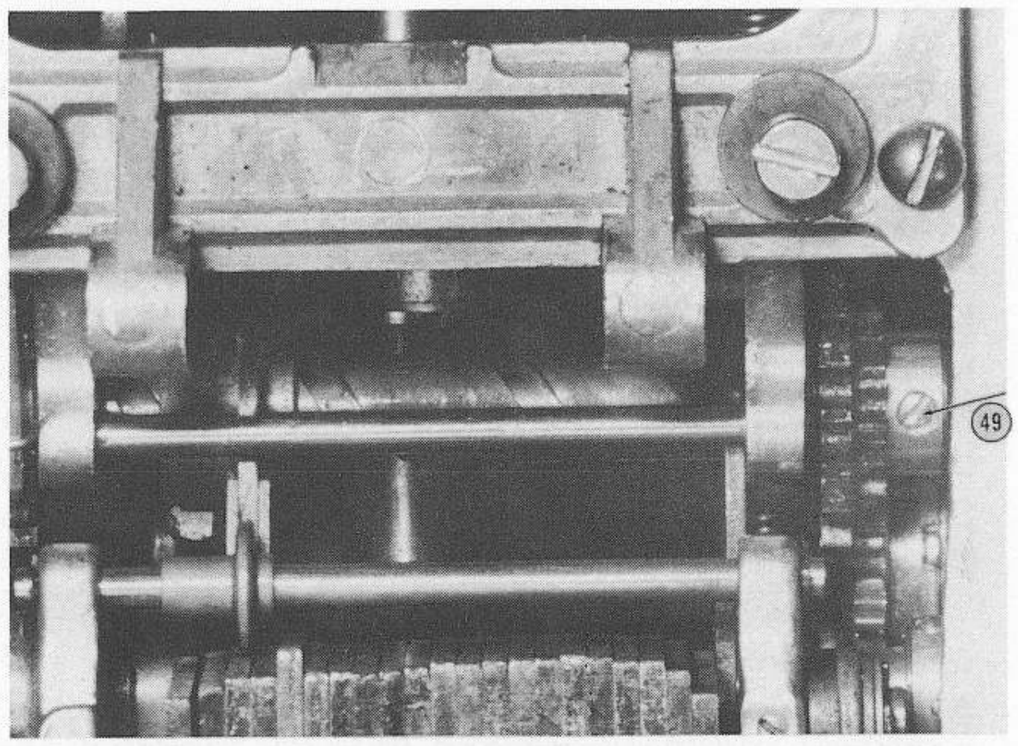


Figure 59

arrow is still not in perfect alignment, the pattern indicator plate can be moved from left to right by loosening the two screws holding it.

PRESSER BAR ASSEMBLY REPLACEMENT

To remove the presser bar, first remove the Patch-O-Matic tension device from the top of the casting by grasping the body of the tension firmly

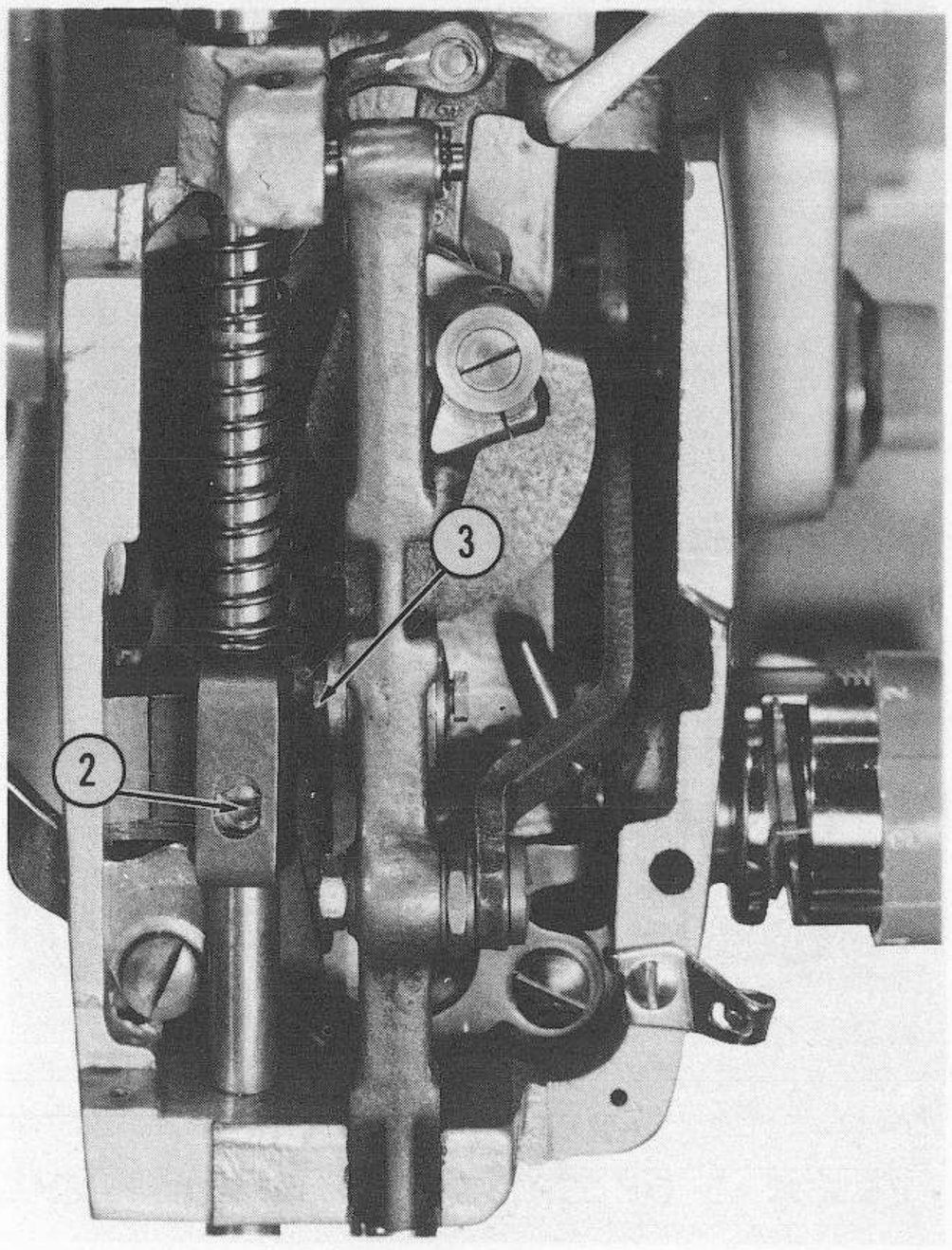


Figure 60

and turning it counterclockwise to unscrew it from the casting. Second, loosen the set screw #2, Fig. 60, holding the presser bar guide block to the presser bar shaft. Third, after removing the presser foot, presser foot clamp screw and the thread cutter, drop the presser bar down as far as possible and remove the presser bar spring by pulling it off the top of the presser bar. Now the presser bar can be pulled from the casting through the top. As the presser bar is pulled through the top of the casting the guide, block and the bushing spacer #3, Fig. 60, can be taken off. The presser bar assembly is replaced in reverse order. IMPORTANT: To obtain correct presser bar height tighten guide block set screw back on original presser bar set screw mark. In any event, presser bar height must be so set that the top of the presser foot at it's highest position does not contact the needle clamp with the needle bar at its lowest position. Also, the presser bar should be so located that the presser foot is in exact alignment with the needle plate slots.

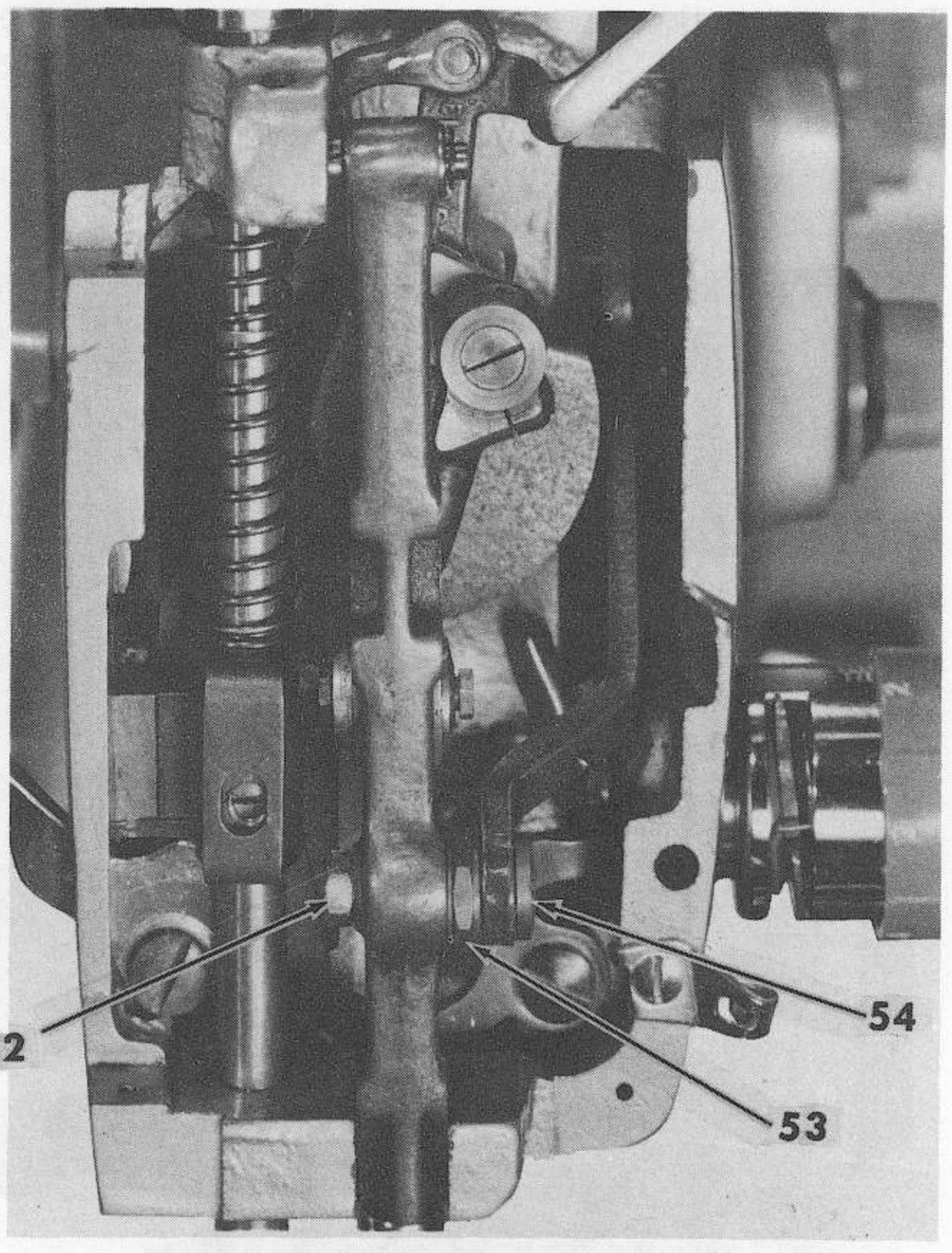


Figure 61

REMOVAL OF THE NEEDLE BAR ASSEMBLY

Removal of the needle bar assembly is quite simple and obvious. First, the bolt #54, Fig. 61, holding the connection lever to the needle bar swing frame, is removed by loosening the hex nut #52 on the left side and unscrewing the bolt. Be careful not to lose the adjusting cam #53 that is part of this assembly. Next, the snap washer holding the needle bar swing frame to the pivot in the casting at the top of the machine is removed. This allows removal of the needle bar swing frame along with the needle bar. The needle bar, block and stud will slip out of the connecting link. Reassemble in reverse order.

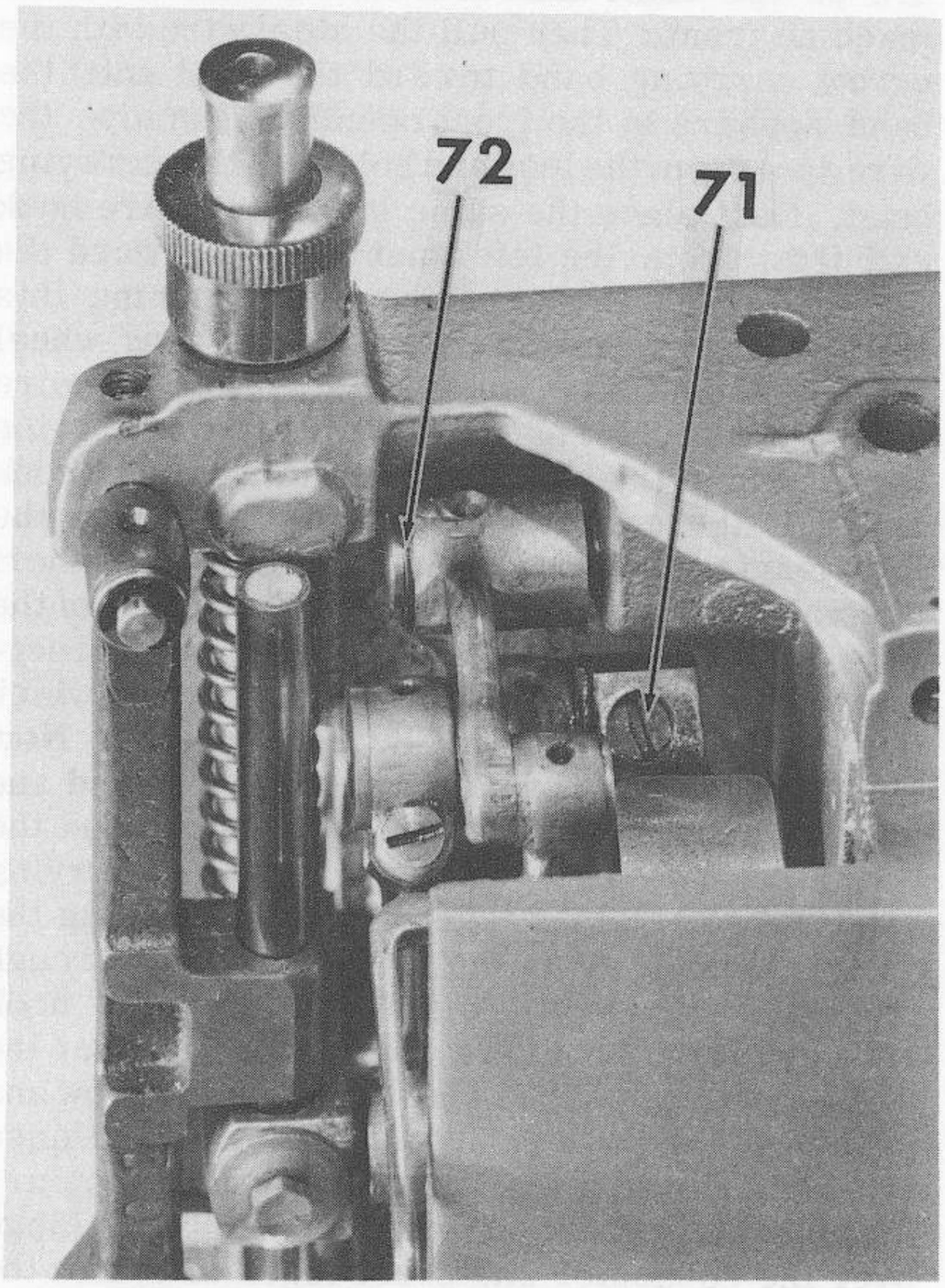


Figure 62

REPLACEMENT OF THE TAKE UP LEVER ASSEMBLY

It is necessary to remove the presser bar block and needle bar assembly in order to remove take up lever assembly completely. Loosen the set screw #71, Fig. 62, holding the take up assembly pivot to the counterweight at the end of the crankshaft. Remove the snap washer at the end of the stud in the casting #72, Fig. 62, and the take up lever assembly can be easily slipped off from the machine. Reassemble in reverse order. Remember, the needle position adjustment will have to be made again once the needle bar assembly has been removed or replaced.

REPLACEMENT OF THE UPPER MAIN SHAFT

This is not recommended for or as a field repair. Refer to the second paragraph in this manual which states, in these cases, create an MCIR per bulletin S-381 and O-260. Send the MCIR to the sewing machine buyer D/620, Chicago, for disposition.

REMOVAL AND REPLACEMENT OF THE HAND WHEEL AND HAND WHEEL CLUTCH SLEEVE

First loosen the set screw in the clutch nut and remove the plastic clutch nut and the clutch washer. The hand wheel will slip off easily by slipping off the belt as you pull out on the hand wheel. If it is necessary at any time to remove the hand wheel clutch sleeve from the main shaft, support the end of the main shaft by placing a heavy hammer under the end of it, or by some other suitable means, as the tapered pin holding the sleeve to the shaft is knocked out. A spacer about 1/4" to 3/8" of an inch long can then be used between the inside end of the clutch nut and the end of the main shaft, the clutch nut being used somewhat as a puller. Be careful to center the spacer so that it will not damage the threads inside the sleeve. Screw in on the clutch nut, and the clutch sleeve will slip toward the end of the shaft. A conventional puller may be used to pull the clutch completely off the shaft. Replacement is in reverse order; be careful to align the hole for the tapered pin with the hole in the main shaft.

When replacing the thread take up lever assembly, the retaining screw in the counterweight should be tightened down on the flat of the pivot stud. Set the screw so that the take up lever will operate smoothly without excess end play.

COUNTERWEIGHT AND CONNECTING ROD

There is little reason for removal of the counterweight to become necessary. If this is done, note that the counterweight is installed with its heavy end toward the machine rear when the crank portion of the mainshaft is in a vertical or up position. That is, the crank leads the counterweight by about 90°. A sleeve type punch must be used to drive out the pin holding the counterweight to the main shaft.

The connecting rod cap and rod are notched on one side in order that the cap may be properly matched to the rod in assembly.

REPLACEMENT OF THE BELT

The belt can be turned off the hand wheel pulley and slipped off the motor pulley, the hand wheel removed and the belt pulled out. The belt is reinstalled in reverse order.

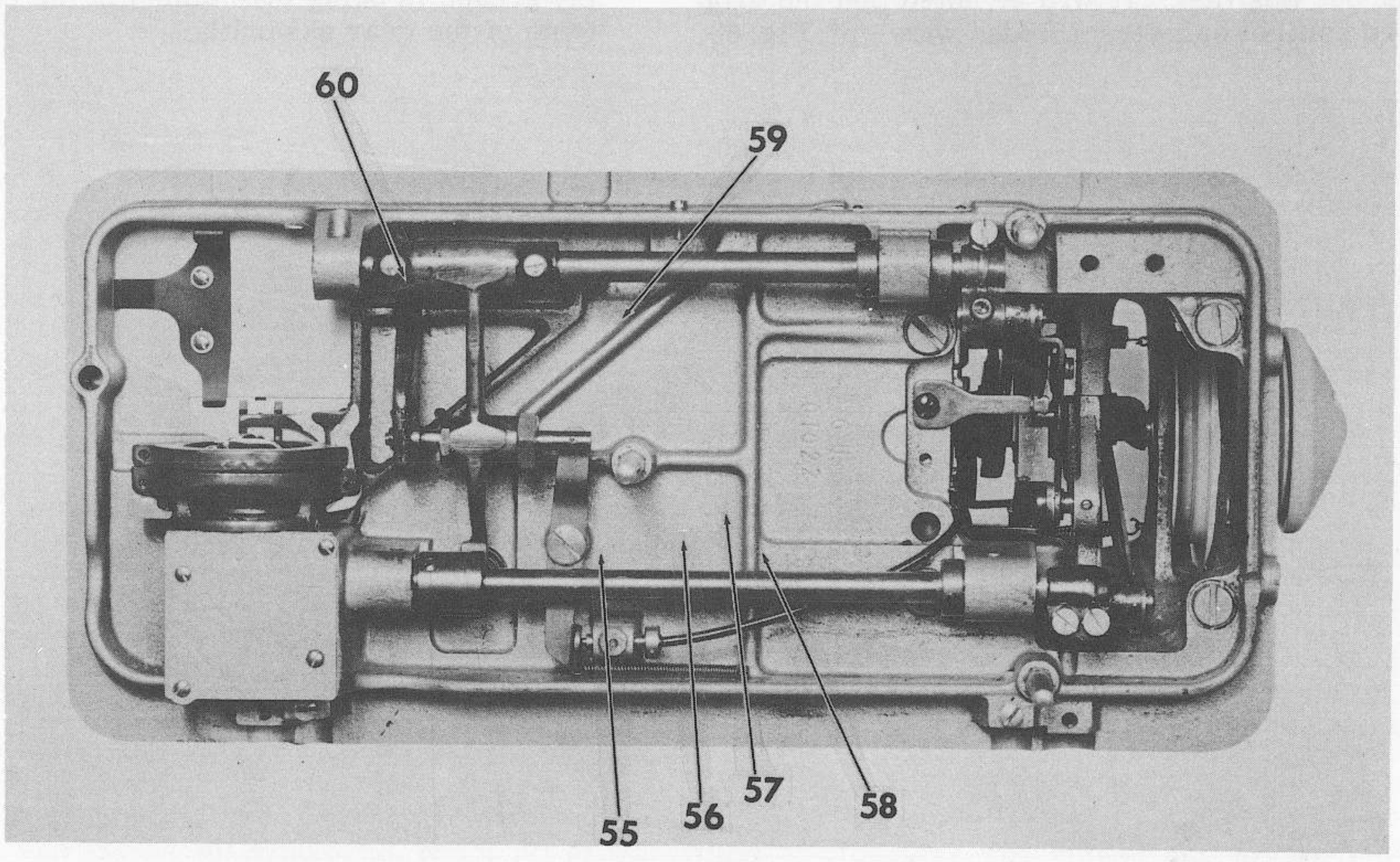


Figure 63

ELECTRIC MOTOR

The electric motor driving this sewing machine is mounted under the base. It is mounted by means of an adjustable bracket which makes it possible to adjust the motor as necessary to obtain correct belt tension. The electric motor is a conventional brush type and should be lubricated with a good quality light grade sewing machine oil not containing any detergent. Frequency of oiling will depend on the amount of use and the conditions under which the machine is operated. Naturally, if the machine is used frequently it will require oiling more often. On the other hand, if it is not used very much, but is stored in a hot dry place, this will dry out the bearings and, therefore, some lubricant should be added before the machine is used the next time. Do not over-oil. One or two drops at each oiling is sufficient.

Other electrical components in this machine are conventional: the rheostat, light, switch assembly, and the wiring to the terminal connection at the base of the machine. This terminal connection is conventional.

ADJUSTMENT OR REPLACEMENT OF THE DROP FEED ASSEMBLY.

The operation of the drop feed control is as stated in the beginning of the manual. When the drop feed button is pushed in and turned to the right it locks out the feed dog. As long as normal operation is desired, the drop feed knob should be in the out position. It will be noted that the drop feed control operates a Boden wire #57, Fig. 63, to a drive pin which slides in a guide bushing #56, underneath the casting of the machine. This guide in turn engages the drop feed swing lever #55 which is attached to the drop feed bar #60. When the drop feed button is pushed in the drop feed spring lever pulls the roller on the end of the drop feed bar #59 out of the feed frame fork #60, thus allowing the feed dog to drop down below the needle plate. The drop feed swing lever is spring loaded. Unless the drop feed control is turned to the right to lock it in place, the swing lever will push the roller back into the fork engaging the feed frame.

SERVICING THE SHUTTLE DRIVE GEAR ASSEMBLY

The shuttle drive gear box should rarely require service. A mitre gear on the end of the shuttle shaft is driven by a gear sector on the shuttle drive main shaft. The gear and gear sector are held in position on their respective shafts by means of two set screws in each. Being so well locked in place they should rarely require any attention. If by chance adjustments are necessary at any time, the gear sector should be so positioned on the shuttle drive main shaft that as it swings in either direction its swing will not disengage it from the mitre gear. After this adjustment is made the rotational timing of the shuttle point will need to be checked again. These gears are lubricated by means of a gear grease and it would be well to check this when a machine is brought into the shop for service to be sure that the grease is being maintained in the contacting teeth of the gear assembly.

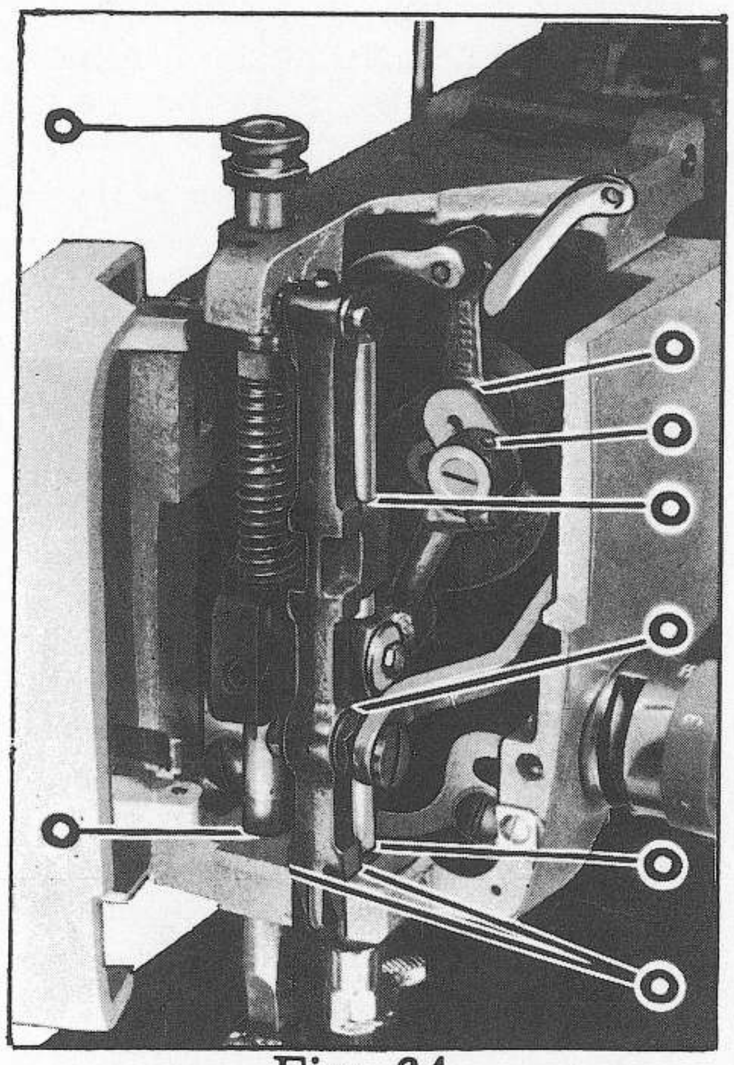


Fig. 64

Swing hinged face cover plate open to oil points indicated at end of machine head.

Cleaning

AND OILING....

Keep the moving parts free from dust and threads for quiet and efficient operation. Cleaning should be done with a small brush; never with a sharp or pointed tool.

When machine runs hard or makes excessive noise, place a drop of KENMORE sewing machine oil at the points indicated in figs. 64, 65, AND 66.

Lift arm coverplate off to oil points indicated at top of machine head.

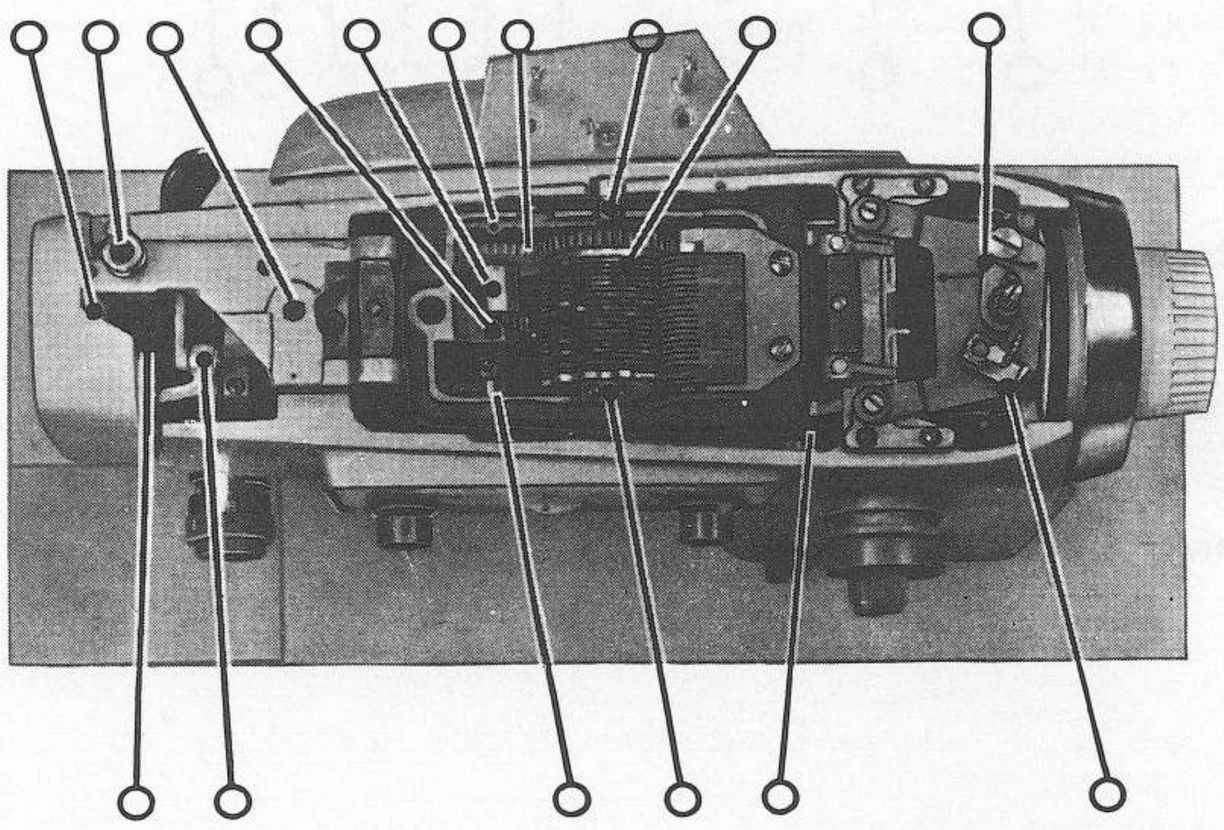
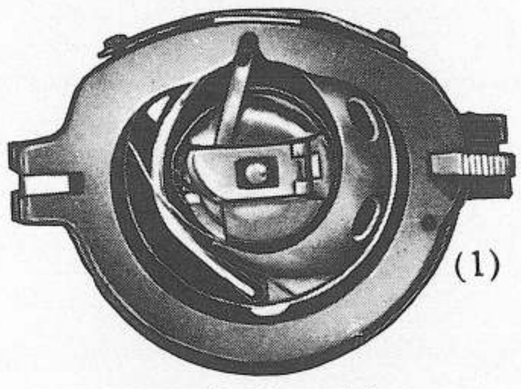


Fig. 65

It may be necessary to clean the shuttle area occasionally.

1. Raise the takeup lever to its highest point and remove bobbin case.
2. Press lever to the right side of the shuttle assembly to open the hook race ring. Lift hook out by the center pin.
3. Brush, remove lint and threads from shuttle race.
4. Put a drop of oil on center pin, on back of shuttle and on front of shuttle race.



(1)

1—Shuttle Assembly

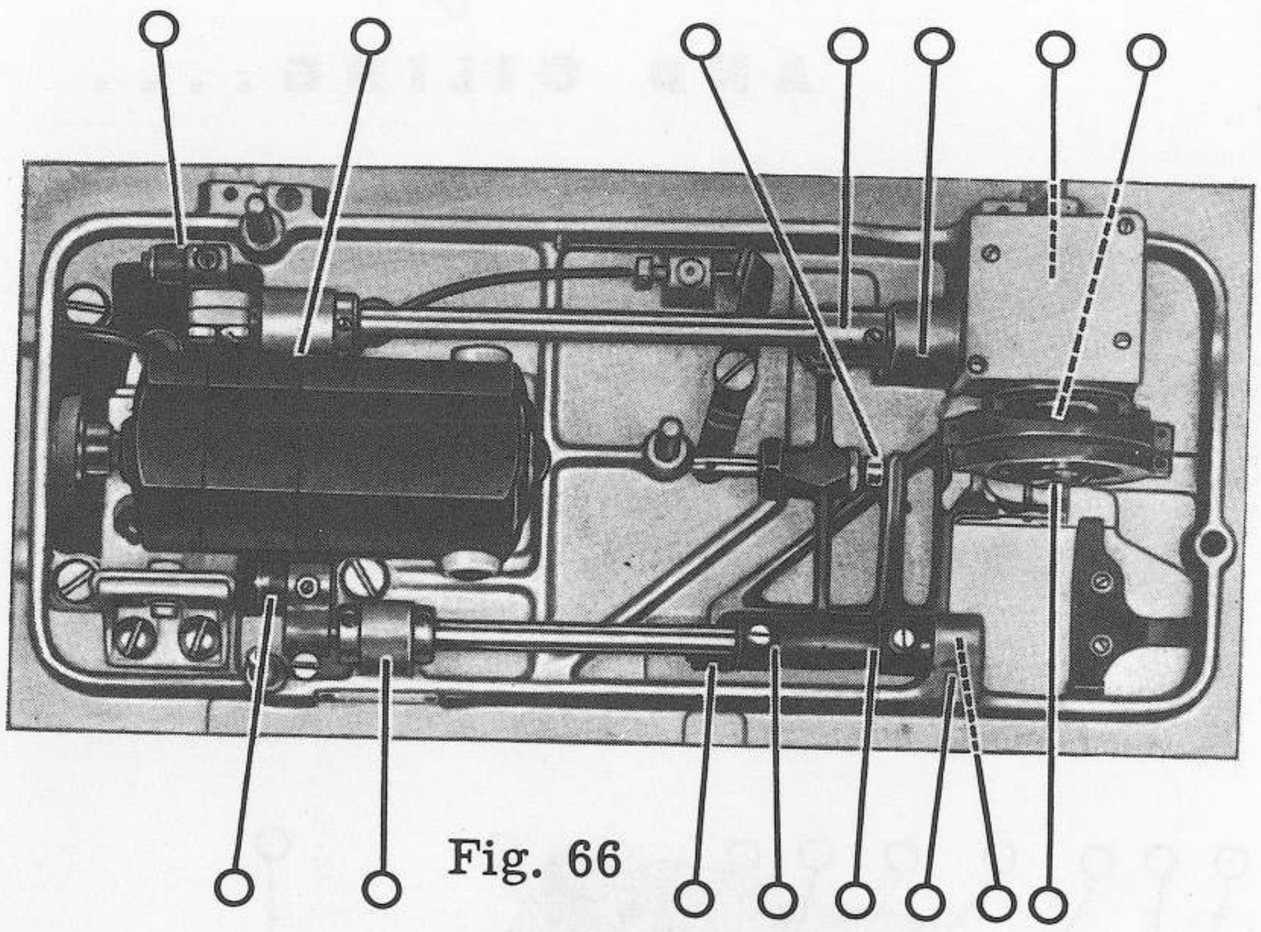
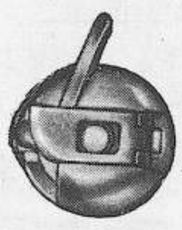


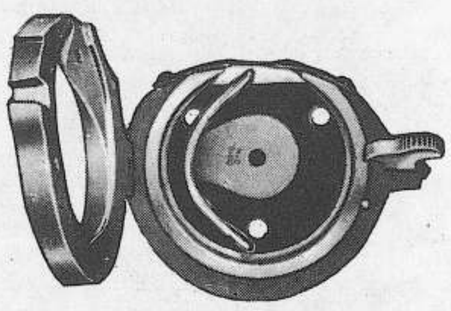
Fig. 66

Tilt machine head back to oil points indicated on under side of machine head.

J—Hook



K— Bobbin Case



L—Hook Race

To re-assemble, hold hook by center pin and fit carefully into assembly opposite the hook driver. Close it by a light pressure on the hook race ring until it snaps into position.

Occasionally remove the needle plate and clean feed dog with a soft brush.

What to Do

PROBLEM	PROBABLE CAUSE	CORRECTION
Irregular Stitches	Incorrect size needle.	Choose correct size needle for thread and fabric
	Improper threading.	Rethread machine
	Loose upper thread tension.	Tighten upper thread tension
	Pulling fabric.	Do not pull fabric; guide it gently
	Light pressure on presser foot.	Increase pressure on presser foot
	Loose presser foot.	Reset presser foot
	Unevenly wound bobbin.	Rewind bobbin
Breaking Needles	Pulling fabric.	Do not pull fabric; guide it gently
	Incorrect size needle.	Choose correct size needle for thread and fabric
	Incorrect setting of needle.	Reset needle
	Loose presser foot.	Reset presser foot
	Incorrect needle position (with double needle only).	Reset needle position to center
	Too wide stitch width. (with double needle only).	Check needle drop
Bunching of Thread	Upper and lower threads not drawn back under presser foot.	Draw both threads back under presser foot
	Feed dog down.	Raise feed dog
Puckering	Incorrect thread tension(s).	Reset thread tension(s)
	Light pressure on presser foot.	Increase pressure on presser foot
	Using two different sizes or kinds of thread.	Upper thread and bobbin thread should be same size and kind.
	Bent or blunt needle.	Insert new needle
	Loose presser foot.	Reset presser foot
	Fabric too sheer or too soft.	Use underlay of tissue paper or tarleton when stitching.

PROBLEM	PROBABLE CAUSE	CORRECTION
Skipping Stitches	Incorrect size needle.	Choose correct size needle for thread and fabric.
	Bent or blunt needle.	Insert new needle
	Incorrect setting of needle.	Reset needle
	Tight upper thread tension.	Loosen upper thread tension
	Light pressure on presser foot.	Increase pressure on presser foot
Breaking Upper Thread	Starting with take-up lever in low position.	Take-up lever must be in highest position when starting to sew.
	Starting to stitch too fast.	Start to stitch at a medium speed.
	Improper threading.	Rethread machine
	Tight upper thread tension.	Loosen upper thread tension
	Incorrect size needle.	Choose correct size needle for thread and fabric
	Sharp eye in needle.	Insert new needle
	Wide stitch width setting (when picking up bobbin thread only).	Set stitch width regulator at 0 when picking up bobbin thread
Breaking Bobbin Thread	Improper bobbin case threading.	Check bobbin case threading
	Tight bobbin thread tension.	Loosen bobbin thread tension
	Lint in bobbin case or shuttle.	Clean bobbin case and shuttle
Fabric not Moving	Feed dog down.	Reset control to "1"
	Light pressure on presser foot.	Increase pressure on presser foot
	Threads knotted under fabric.	Place both threads back under presser foot before beginning to stitch.
Machine Jamming	Thread caught in shuttle.	Disassemble and clean shuttle

NOTE: SEE SUMMARY OF PROPER CONTROL SETTINGS FOR STRAIGHT OR ZIGZAG STITCHING - PAGE 10

PARTS LIST FOR

KENMORE
SEWING MACHINE HEAD

MODEL NUMBERS 516.890 and 516.891

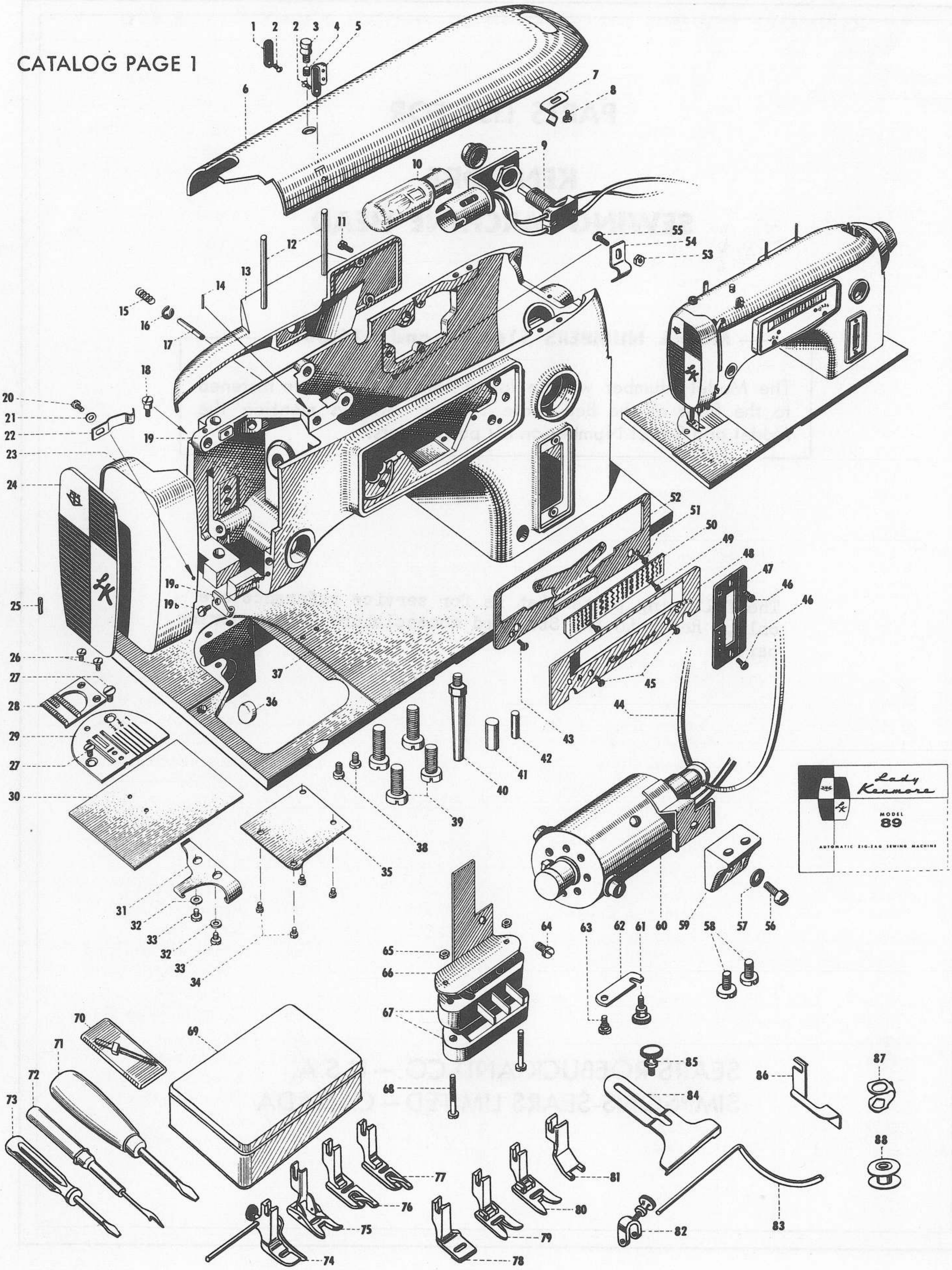
The Model Number will be found stamped on a plate fastened to the front of the Bed Plate Flange. Always mention the Model and Serial Number on all parts orders.

The following parts list is for service reference use only. Refer to the Standard Nomenclature when ordering parts.

SEARS ROEBUCK AND CO. – U.S.A.
SIMPSONS-SEARS LIMITED – CANADA

KENMORE SEWING MACHINE HEAD—MODEL NUMBER 516.890

CATALOG PAGE 1



PARTS LIST FOR
KENMORE SEWING MACHINE HEAD—MODEL NUMBER 516.890

Sears No.	Cat. Page	Key No.	Description
22373	1	1	Back Thread Guide
22374	1	2	Screw
22376	1	3	Bobbin Winder Tension Assembly
22377	1	4	Screw
22372	1	5	Front Thread Guide
22371	1	6	Top Cover with Stud
22375	1	7	Latch Clip
22173	1	8	Screw
22165	1	9	Socket with Cord Assembly
22166	1	10	Bulb -
22168	1	11	Screw
22167	1	12	Spool Pin
22163	1	13	Sewlight
22370	1	14	Pin
22369	1	15	Pressure Spring
22368	1	16	Washer
22367	1	17	Stud
22176	1	18	Screw
22003	1	19	Arm
22173	1	20	Screw
22174	1	21	Disc
22172	1	22	Latch Clip
22170	1	23	Face Cover
22171	1	24	Face Cover Inlay
22175	1	25	Pin
21035	1	26	Screw
22363	1	27	Screw
21034	1	28	Feed Dog
22362	1	29	Needle Plate
22361	1	30	Hand Hole Cover
21050	1	31	Hand Hole Cover Spring
21051	1	32	Disc
8106	1	33	Screw
21016	1	34	Screw
21015	1	35	Gear Box Cover
22364	1	36	Cap Plug
22004	1	37	Bed Plate
22365	1	38	Screw
22006	1	39	Screw
22012	1	40	Pin
22007	1	41	Pin
22008	1	42	Pin
22332	1	43	Screw
22403	1	44	V-Belt
22332	1	45	Screw
22101	1	46	Screw
22100	1	47	Stitch Length Control Plate
22336	1	48	Transparent Front Plate
22335	1	49	Screw
22334	1	50	Pattern Panel
22366	1	19A	Eyelet
22333	1	19B	Screw
22333	1	51	Screw
22331	1	52	Plate
22179	1	53	Hex Nut
22177	1	54	Cord Clip
22178	1	55	Screw
22144	1	56	Screw
22400	1	57	Disc
22402	1	58	Screw
22401	1	59	Motor Bracket
22399	1	60	Motor
22410	1	61	Screw
22408	1	62	Cord Clip
22409	1	63	Screw
22192	1	64	Screw
22407	1	65	Hex Nut
22405	1	66	Receptacle Bracket
22404	1	67	Receptacle
22406	1	68	Screw
22378	1	69	Accessory Box
22398	1	70	Twin Needle
22394	1	71	Screw Driver (Long)
22396	1	72	Buttonhole Cutter
22395	1	73	Screw Driver (Small)
22381	1	74	Edge Stitcher with Guide
22387	1	75	Plexiglass Foot
22379	1	76	Hemmer (4 mm)
22380	1	77	Hemmer (2 mm)
22383	1	78	Ruffler
22384	1	79	Beading Foot
22386	1	80	Applique Foot
22385	1	81	Button Foot
22388	1	82	Clamp for Quilting Wire Guide with Screw
22389	1	83	Quilting Wire Guide
22391	1	84	Hem Guide
22392	1	85	Guide Screw
22382	1	86	Blind Stitching Plate
22397	1	87	Thread Cutter
22393	1	88	Bobbin
22411	1	89	Instruction Book

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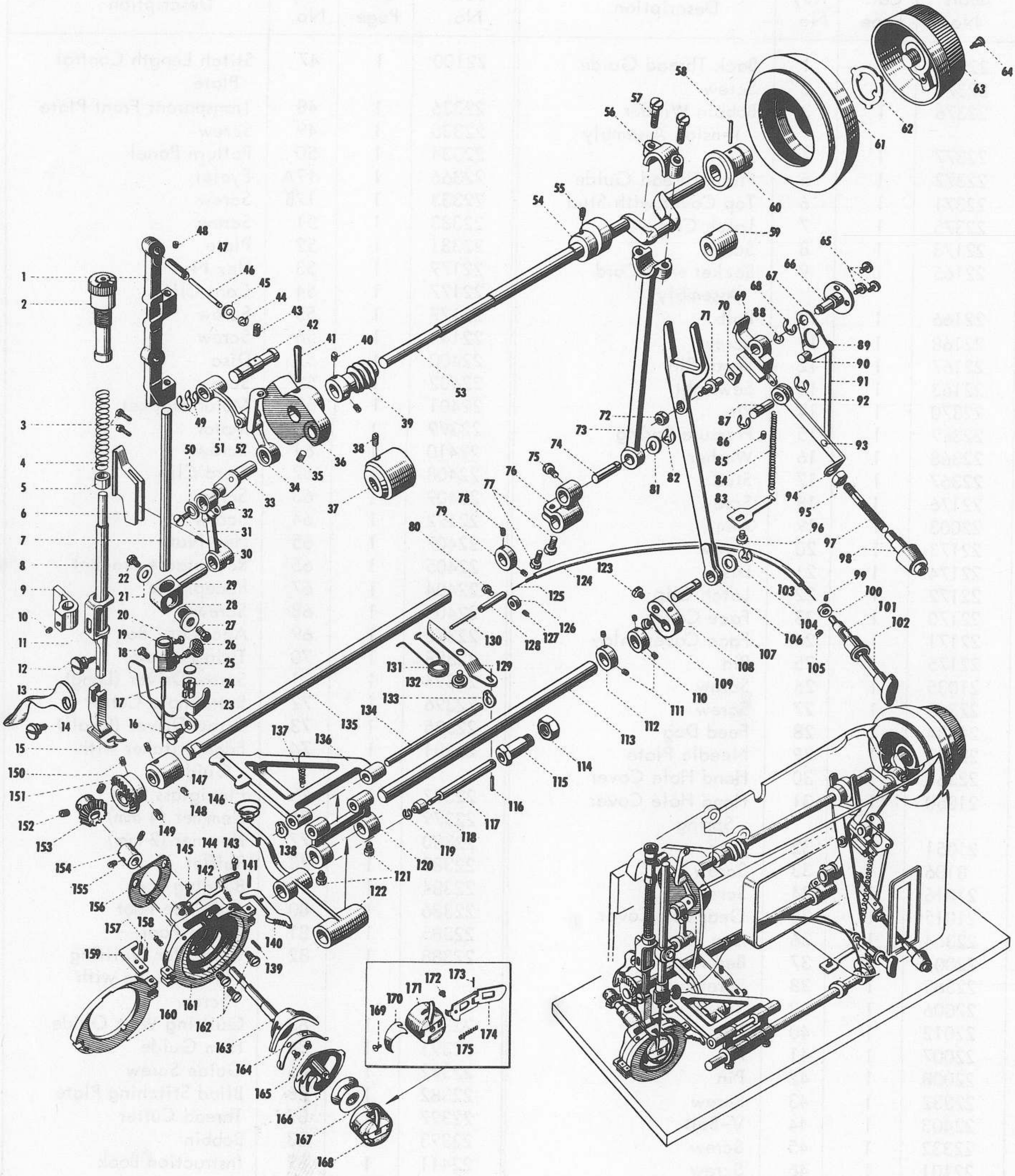
KENMORE SEWING MACHINE HEAD—MODEL NUMBER 516.890

CATALOG PAGE 2



PARTS LIST FOR KENMORE SEWING MACHINE HEAD—MODEL NUMBER 516.890

PARTS LIST

Sears No.	Cat. Page	Key No.	Description
22048	2	1	Needle Bar Swing Frame
22057	2	2	Patch-O-Matic
22038	2	3	Screw
22058	2	4	Presser Bar Spring
22062	2	5	Bushing
22037	2	6	Guide Block
22049	2	7	Needle Bar
22084	2	8	Presser Bar
22059	2	9	Presser Bar Guide
22060	2	10	Screw
22061	2	11	Presser Bar Lifter Block
22068	2	12	Sewing Foot Screw
22063	2	13	Presser Bar Lifter
22064	2	14	Screw
22067	2	15	Sewing Foot
22066	2	16	Screw
22056	2	17	Needle
22054	2	18	Screw
22050	2	19	Needle Clamp with Eyelet with Key #24 and #25
22053	2	20	Screw
22042	2	21	Washer
22043	2	22	Head Screw
22065	2	23	Tension Release Lever
22051	2	24	Needle Locating Plug
22052	2	25	Washer
22055	2	26	Thumb Screw
22044	2	27	Fastening Screw
22041	2	28	Pivot Sleeve
22040	2	29	Needle Bar Block
22031	2	30	Guide Link with Key #32 (Screw)
22034	2	31	Screw
22032	2	32	Screw
22028	2	33	Pivot Stud and Link for Take-Up and Guide Link
22026	2	34	Thread Take-Up Assembly with Key #51 and #52
22023	2	35	Screw
22022	2	36	Front Counter Balance
22009	2	37	Bushing (Front)
22010	2	38	Screw
22015	2	39	Worm Gear
21018	2	40	Set Screw
22024	2	41	Pin
22035	2	42	Pivot Pin
22010	2	43	Screw
21004	2	44	Washer
22045	2	45	Washer
22047	2	46	Pivot Stud
22046	2	47	Bushing
7989	2	48	Pin
22036	2	49	Washer
22033	2	50	Washer
22027	2	51	Take-Up Link
22029	2	52	Rivet for Take-Up
22014	2	53	Upper Shaft
22016	2	54	Feed Cam
22017	2	55	Screw
22140	2	56	Cap - Use Key #73
22110	2	57	Screw - Use Key #73
8137	2	58	Clutch Sleeve Pin
22011	2	59	Bushing (Back)
21000	2	60	Clutch Sleeve
22018	2	61	Handwheel
22019	2	62	Clutch Nut Stop Screw
22020	2	63	Clutch Nut Assembly
22021	2	64	Screw
22087	2	65	Screw
22086	2	66	Flange
22090	2	67	Lever
8271	2	68	Washer
22081	2	69	Slide Block
22082	2	70	Feed Connection (Slide Block)
22083	2	71	Stud
22085	2	72	Hex Nut
22140	2	73	Main Connection Rod Assembly with Key #56 and #57
22141	2	74	Screw Stud
22111	2	75	Screw
22143	2	76	Rocker
22144	2	77	Screw
22124	2	78	Screw
22123	2	79	Stop Collar
22139	2	80	Screw
22142	2	81	Disc
22036	2	82	Washer
22104	2	83	Spring Fixture
22103	2	84	Retracting Spring
22079	2	85	Screw
22099	2	86	Washer
22098	2	87	Stud
22088	2	88	Washer
22093	2	89	Stud
22091	2	90	Stud
22092	2	91	Main Connection Rod
22099	2	92	Washer
22093	2	93	Stud
22095	2	94	Stitch Adjustment Lever Assembly with Bushing
22097	2	95	Hex Nut
22105	2	96	Screw
22096	2	97	Screw
22102	2	98	Stitch Length Adjustment Knob Complete
22133	2	99	Screw
22132	2	100	Stop Collar
22134	2	101	Stop Bushing
22135	2	102	Drop Feed Knob Assembly
22036	2	103	Washer
22108	2	104	Disc
22079	2	105	Screw
22106	2	106	Feed Connection Rod
22107	2	107	Stud
22109	2	108	Rocker
22110	2	109	Screw
22123	2	110	Stop Collar
22124	2	111	Screw
22123	2	112	Stop Collar
22113	2	113	Main Shaft
21011	2	114	Hex Nut
21012	2	115	Eccentric Bushing
22121	2	116	Pin
22120	2	117	Drop Feed Bar
21038	2	118	Feed Link and Roller Assembly
21004	2	119	Washer
22114	2	120	Main Shaft Lever
21042	2	121	Screw
22119	2	122	Feed Fork
22111	2	123	Screw
22137	2	124	Wire Tube
22136	2	125	Bowden Wire
22138	2	126	Stop Collar
22133	2	127	Screw
22130	2	128	Guide Bushing
22127	2	129	Drop Feed Swing Lever
22131	2	130	Pin
22129	2	131	Spring
22128	2	132	Screw
22117	2	133	Washer
22116	2	134	Feed Frame Axle
22145	2	135	Main Shaft
22115	2	136	Feed Frame
22118	2	137	Retracting Spring
22117	2	138	Washer
21027	2	139	Pin
21028	2	140	Snap-On Lever
21027	2	141	Pin
21029	2	142	Needle Shroud
21030	2	143	Screw
21026	2	144	Pressure Spring
21030	2	145	Screw
22122	2	146	Pressure Spring
22125	2	147	Feed Fork Cam
22126	2	148	Screw
22126	2	149	Screw
22126	2	150	Screw
21017	2	151	Drive Gear
22146	2	152	Screw
21019	2	153	Drive Gear
22147	2	154	Stop Collar
22146	2	155	Screw
22149	2	156	Disc
21027	2	157	Pin
21026	2	158	Pressure Spring
21025	2	159	Hinge
21024	2	160	Race Cover
21023	2	161	Shuttle Race
22150	2	162	Screw
22148	2	163	Shuttle Driver Assembly
21032	2	164	Shuttle Driver Spring
21033	2	165	Screw
22151	2	166	Shuttle Assembly
22161	2	167	Bobbin
22152	2	168	Bobbin Case Assembly
22286	2	169	Tension Spring Screw
22156	2	170	Tension Spring
22153	2	171	Bobbin Case
22155	2	172	Screw
22160	2	173	Pin
22157	2	174	Latch Assembly
22154	2	175	Spring (Bobbin Case Latch)

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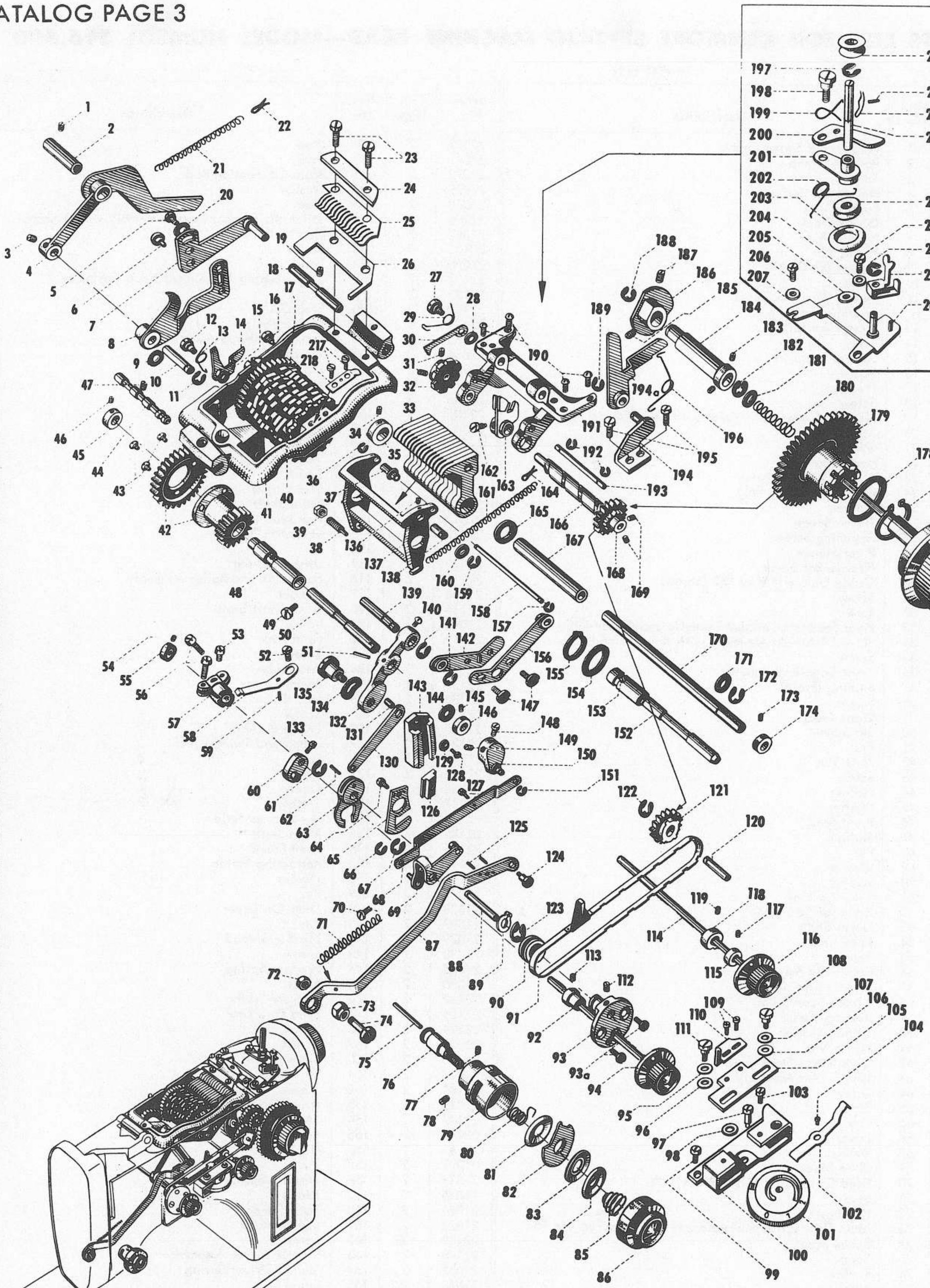
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PARTS LIST FOR KENMORE SEWING MACHINE HEAD—MODEL NUMBER 516.890

Sears No.	Cat. Page	Key No.	Description
22238	3	1	Screw
22237	3	2	Bushing
22247	3	3	Pin
22239	3	4	Transmission Lever Assembly
22243	3	5	Screw
22242	3	6	Stud
22241	3	7	Regulating Lever Assembly
22240	3	8	Slide Block Disengaging Lever with Bushing Assembly
22246	3	9	Disc
22245	3	10	Stud
22099	3	11	Washer
22279	3	12	Screw
22288	3	13	Spring
22285	3	14	Stop Lever
22281	3	15	Disc
22317	3	16	Screw
22309	3	17	Gear Assembly
22329	3	18	Housing Shaft
22330	3	19	Screw
22244	3	20	Disc
22248	3	21	Retracting Spring
22249	3	22	Spring Wire
22290	3	23	Screw
22269	3	24	Plate
22268	3	25	Claw Follower Spring
22289	3	26	Stop Plate
22279	3	27	Screw
22281	3	28	Disc
22280	3	29	Spring
22278	3	30	Stop Lever
22276	3	31	Screw
22277	3	32	Stop Disc
22250	3	33	Claw Followers Assembly
22133	3	34	Screw
22259	3	35	Stop Collar
22198	3	36	Washer
22258	3	37	Selector Disc
22252	3	38	Eccentric Screw
22253	3	39	Hex Nut
22316	3	40	Cams (Assembled)
22284	3	41	Cam Housing
22291	3	42	Worm Gear Assembly
22292	3	43	Screw
22328	3	44	Housing Eccentric Shaft
22297	3	45	Stop Collar
22133	3	46	Screw
22330	3	47	Screw
22293	3	48	Worm Gear Bushing
22299	3	49	Screw
22294	3	50	Gear Support Axle
22296	3	51	Pin
22192	3	52	Screw
22206	3	53	Screw
22133	3	54	Screw
22209	3	55	Stop Collar
22202	3	56	Screw
22200	3	57	Needle Position Stop Plate
22203	3	58	Pressure Spring
22204	3	59	Pin
22205	3	60	Needle Position Rocker
22088	3	61	Washer
22217	3	62	Pin
22214	3	63	Shift Bracket Fork Assembly
22320	3	64	Screw
22319	3	65	Transmission Guide Plate
22198	3	66	Washer
22088	3	67	Washer
22194	3	68	Connecting Link
22195	3	69	Connecting Bracket Assembly
22327	3	70	Screw
22326	3	71	Retracting Spring
22324	3	72	Hex Nut
22323	3	73	Eccentric
22325	3	74	Screw
22078	3	75	Pin
22071	3	76	Tension Pin
7989	3	77	Screw
22079	3	78	Screw
22070	3	79	Tension Assembly Shell
22072	3	80	Auxiliary Spring
22073	3	81	Tension Disc
22074	3	82	Washer
22073	3	83	Tension Disc
22075	3	84	Stopper Disc
22076	3	85	Coil Spring
22077	3	86	Adjusting Knob
22318	3	87	Connecting Lever with Key #65, #72, #73, #124 and #125
22215	3	88	Stud
22219	3	89	Washer
22213	3	90	Roller
22222	3	91	Arrow Carrying Cord with Arrow
22211	3	92	Stop Collar
22212	3	93	Flange
22218	3	93A	Screw
22208	3	94	Adjustment Knob (Left)
22190	3	95	Friction Washer
22189	3	96	Washer
22183	3	97	Stud
22184	3	98	Washer
22192	3	99	Screw
22181	3	100	Adjustment Disc Support
22182	3	101	Stop Adjustment Disc
22185	3	102	Pressure Spring
22192	3	103	Screw
22186	3	104	Screw
22187	3	105	Slide Stop Bracket
22189	3	106	Washer
22190	3	107	Friction Washer
22191	3	108	Screw
8106	3	109	Screw
22188	3	110	Stop Finger Bracket
22191	3	111	Screw
22079	3	112	Screw
22133	3	113	Screw
	3	114	Use Key #116
22209	3	115	Stop Collar
22207	3	116	Adjustment Knob (Right)
22133	3	117	Screw
22199	3	118	Stop Collar
7989	3	119	Screw
22221	3	120	Gear Wheel Stud
22220	3	121	Gear Wheel
22088	3	122	Washer
8271	3	123	Washer
22321	3	124	Screw
22322	3	125	Tension Pin
22303	3	126	Slide Block with Key #131 and #143
21016	3	127	Screw,
22306	3	128	Screw
22305	3	129	Spacing Washer
22216	3	130	Connecting Lever
22304	3	131	Pin
22295	3	132	Zig Zag Transmission Lever
22206	3	133	Screw
22307	3	134	Washer
22308	3	135	Screw
22133	3	136	Screw
22251	3	137	Claw Followers Swing Frame
22256	3	138	Stud
22298	3	139	Stud
22300	3	140	Screw
22088	3	141	Washer
22261	3	142	Connecting Lever with Bushing Assembly (Left)
22302	3	143	Slide
22210	3	144	Friction Washer
22133	3	145	Screw
22209	3	146	Stop Collar
22262	3	147	Screw
22197	3	148	Screw
7989	3	149	Screw

PARTS LIST FOR KENMORE SEWING MACHINE HEAD—MODEL NUMBER 516.890

Sears No.	Cat. Page	Key No.	Description
22196	3	150	Stitch Width Rocker
22198	3	151	Washer
22312	3	152	Cam Shaft
22313	3	153	Tension Pin
22310	3	154	Disc
22311	3	155	Washer
22260	3	156	Connecting Lever with Bushing Assembly (Right)
22198	3	157	Washer
22255	3	158	Axle
22088	3	159	Washer
22257	3	160	Disc
22265	3	161	Retracting Spring
22272	3	162	Screw
22271	3	163	Selector Disc Positioner Assembly
22249	3	164	Spring Wire
22267	3	165	Disc
22274	3	166	Selector Disc Positioner Axle
22254	3	167	Claw Follower Bushing
22275	3	168	Gear Assembly
22276	3	169	Screw
22263	3	170	Swing Frame Axle
22266	3	171	Disc
22099	3	172	Washer
22133	3	173	Screw
22264	3	174	Stop Collar
22227	3	175	Selector Knob Assembly
22226	3	176	Switch Knob Assembly
22231	3	177	Washer
22230	3	178	Disc
22229	3	179	Selector Gear Assembly
22233	3	180	Pressure Spring
22232	3	181	Disc
22228	3	182	Washer
22235	3	183	Screw
22234	3	184	Spring Bushing
7989	3	185	Screw
22236	3	186	Switch Knob Eccentric
7989	3	187	Screw
22228	3	188	Washer
22099	3	189	Washer
22282	3	190	Screw
22270	3	191	Support with Bushing
22198	3	192	Washer
22273	3	193	Guiding Axle
22224	3	194	Disengaging Lever Bracket Assembly
22223	3	194A	Disengaging Lever Assembly
22105	3	195	Screw
22225	3	196	Spring
22099	3	197	Washer
22353	3	198	Screw
22355	3	199	Spring
22352	3	200	Trip Lever
22343	3	201	Spindle Arm
22354	3	202	Spring
22351	3	203	Rubber Ring
22359	3	204	Disc
22339	3	205	Bobbin Winder Plate with Bushing and Stud
22358	3	206	Screw
22359	3	207	Disc
22342	3	208	Pin
22356	3	209	Winder Action Stop Lever
22088	3	210	Washer
22358	3	211	Screw
22350	3	212	Pulley
22347	3	213	Spindle
22348	3	214	Wire Spring
22349	3	215	Pin
22357	3	216	Bobbin
22315	3	217	Screw
22314	3	218	Straight Stitch Stop Plate

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PARTS NOT ILLUSTRATED

60784 - Set of Attachments.
22414 - Complete Accessory Set - Includes Key No. 69 through 88, except 70.

The model #516.891 differs from model #516.890 as follows:

Change in motor, motor bracket and motor pulley.

MOTOR - The motor, as illustrated on Page 2 of this nomenclature and presently furnished on #516.890, is not available as shown, for replacement purposes. If motor on model #516.890 needs replacing, it will be necessary to order the following:

1. Motor - Part No. 22399
2. Motor Bracket - Part No. 22412
3. Motor Pulley - #60987 (Motor Pulley on illustrated motor is #60787)

For model #516.891, these changes are already incorporated and the parts are available individually.

TEST FOR SERVICE ISSUE DIV. 20. NO. 5 - KENMORE AUTOMATIC ZIGZAG SEWING MACHINE MODELS 516.890 AND 516.891

The following quiz has been prepared to cover completely the material contained in this issue of SERVICE. The correct answer is to be indicated in the space provided.

The Service Manual must be made available for reference while the test is being given.

DON'T GUESS - - - - KNOW ! ! ! !

NOTE: After completing the test, serviceman should detach this page and turn it in to the store's training supervisor.

1. The salesman is responsible to initially instruct the customer on the care and operation of this sewing machine.

   True_____ False_____

2. The customer is responsible after initial instructions to maintain proper tensions, cleaning and oiling as outlined in the Customer Instruction Booklet.

   True_____ False_____

3. A cracked base should be replaced in the local store service shop.

   True_____ False_____

4. Which of the following stitch patterns will this model produce ?

   a. Straight Stitch b. Zigzag Stitch
   c. Curve Stitch d. Fashion Stitch

5. The bobbin winding operation is performed entirely at the top of this machine.

   True_____ False_____

6. It is necessary to insert the proper cam to produce the desired fashion stitch pattern.

   True_____ False_____

7. The auxiliary check spring should relax tension on the upper thread between the time the point enters and the eye of the needle disappears into the fabric sewn.

   True_____ False_____

8. The tension release pin functions to release thread tension when the presser bar lever is lifted.

   True_____ False_____

9. The cam shaft locking lever is visible at the rear of the machine on the left side of the cam packet.

   True_____ False_____

10. It is always necessary to remove the cam packet in order to adjust the needle position.

    True_____ False_____

11. With the Width Lock set at buttonhole, the Width Control Knob should be felt to slip into place on the No. 2 position.

    True_____ False_____

12. The cam packet and swinging frame support bracket must first be removed before the swinging frame can be released and taken from the machine.

    True_____ False_____

13. The Selector Switch and Selector Control Knobs can be pulled directly off their shafts at the front of the machine.

True _____ False _____

14. The set screws holding the indicator stop detent collar to its shaft are loosened when centering the selector disc positioner to the cam follower claws.

True _____ False _____

15. The set screws holding the indicator stop detent collar to its shaft are loosened when aligning the indicator arrow to the pattern dial marks.

True _____ False _____

16. The Pattern Selector should be set for one of the curved stitches when replacing the cam packet.

True _____ False _____

17. Correct adjustment of the cam claw follower stop plate must allow for both claw to cam and disc to claw clearance.

True _____ False _____

18. When adjusting for correct needle positioning the Pattern Selector should be set on straight stitch.

True _____ False _____

19. There is no adjustment for needle deflection.

True _____ False _____

20. Rotational and needle bar stroke timing are one and the same.

True _____ False _____

21. An eccentric located on the shuttle gear box drive shaft controls the vertical feed motion.

True _____ False _____

22. The sewing machine can be adjusted to obtain symmetrical shaping of all decorative and curved stitching.

True _____ False _____

23. The set screws holding the gear to the pattern selector worm shaft are loosened in order to correct the reading of the pattern selector indicator arrow.

True _____ False _____

24. The adjustments for needle position, deflection, width of bight and straight stitching are inter-related, if one is altered the others may all require adjustment.

True _____ False _____

25. The hand wheel must be removed in order to remove the belt.

True _____ False _____

26. The electric motor on this machine never requires oiling.

True _____ False _____

27. The drop feed feature cannot be mechanically serviced.

True _____ False _____

28. This machine employs bearings which never require oiling.

True _____ False _____

SERVICEMAN'S NAME _____

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FACTORY APPROVED METHODS
GENUINE SEARS PARTS
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PROMPT—EFFICIENT—ECONOMICAL